Products finishing

This copy is your personal guide to the **National Metal Exposition**

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OCTOBER • • 1937

All LIONITE Polishing Grains are graded to rigid standards—each keg within the standards of its size—each lot a duplicate of those produced before. For the user, this accurate sizing means higher rates of production . . . more uniform finishes . . . a minimum of rejections . . . all around better polishing at lower polishing costs.

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PRODUCTS finishing

HOWARD CAMPBELL, Editorial Director
FRED W. VOGEL, Managing Editor

Volume 2 OCTOBER, 1937 Number 1

Member CCA

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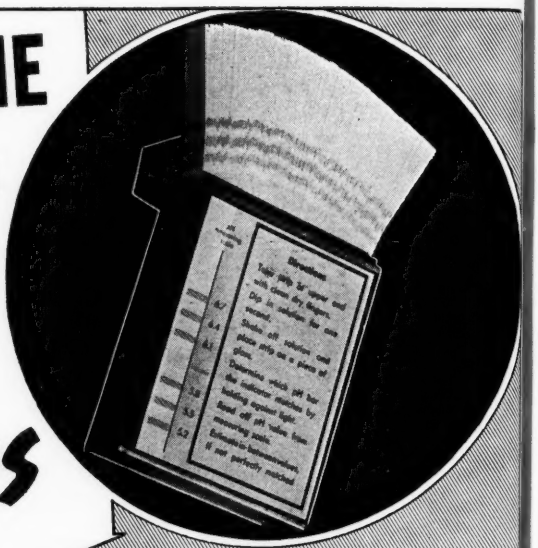
DETERMINE pH in 5 SECONDS with UDYLITE pH PAPERS



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Packed neatly in boxes of 200 strips, the papers may be carried in the pocket or kept in any handy spot. Udylite pH papers are available in seven pH ranges from 0.9 (strongly acid) to pH 13.5 (strongly alkaline).

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ANYONE CAN DETERMINE pH IN 5 SECONDS! HERE'S HOW IT IS DONE

First select a test paper of the desired pH range. In this illustration, the pH paper selected is for white nickel solution with pH between 5.2 and 6.7.

Dip the paper well into the solution so that all color bands are immersed. A quick dip of about one second is all that is necessary.

Remove, shake off excess solution and hold up to the light to compare. Beginners may obtain better results by placing the wet paper on a glass plate.

Products Finishing

CINCINNATI, OHIO VOL. 2, No. 1

OCTOBER, 1937

An Invitation

from E. C. BAIN,
President, American Society for Metals

TO the technicians, engineers, and executives of the American metal manufacturing and finishing industries, greetings. I consider it a great honor to have the privilege of extending to the readers of Products Finishing a very cordial invitation to attend the National Metal Congress and National Metal Exposition which is to be held in the Auditorium at Atlantic City, New Jersey, October 18 to 22, 1937.

E. C. Bain

To those who had the privilege of attending the Congress and Exposition last year, no renewal of the invitation is necessary, because all know that the great amount of benefit to be derived from this convention always acts as a stimulant to repeated attendance.

To those of you who did not attend the biggest annual event in the industry last year, may I urge you to make every effort to be present this year. By coming to Atlantic City from October 18 to 22, inclusive, you will see displays of products and services which have been made available to the manufacturers of America by more than 225 leading industrial organizations. Among them will be actual operating exhibits presenting the newest in scientific developments and in research equipment.

At the Metal Congress approximately 145 authoritative technical papers will be read by scientists of high standing in the five technical societies which are cooperating in this Congress and Exposition. Visitors to the Metal Congress will have the privilege of hearing any or all of these speakers. This is the one time of the year when the leading scientists of the metal working and finishing industries come out of their laboratories and get together to exchange ideas regarding the developments that have taken place in their respective branches of industry during the previous twelve months, and it is the one time when the manufacturer or production engineer is privileged to not only hear the reports of the research that has gone forward, but in many cases to see demonstrations of this research in actual operation.

Registration is the only requirement for admission for anyone engaged in any phase of metal production, fabrication, or finishing. You do not have to be a member of any of the cooperating societies in order to be assured of a sincere and cordial welcome. By coming to Atlantic City and participating in the convention, you will profit by making yourself a better-informed engineer or executive and thus a more valuable man for your company.

Sincerely yours,

American Society for Metals

E. C. Bain

President.

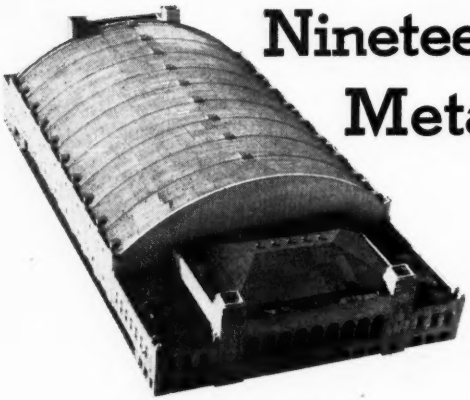
View of Cleveland Exhibit in 1936

(Above) W. P. Woodside, *Treasurer, Climax Molybdenum Corporation.* (Upper Center) E. C. Bain, *President, U. S. Steel Corporation.*

(Above) G. B. Waterhouse, *Vice-President, Massachusetts Institute of Technology.* (Left) W. H. Eisenman, *Secretary.*

Officers of American Society for Metals

The men who greet you from this page—officers of the American Society for Metals—have been untiring in their efforts to make the Nineteenth National Metal Congress and Exposition the outstanding event of the year in the metal-working field. It has been their task to work with the show management in planning and assembling this show, and upon them has been the responsibility of ensuring that all exhibits of machines, tools, and other equipment will be in place and ready for demonstration when the doors of the exhibition open on the morning of October 18th. The fact that every available foot of floor space in the Auditorium has been reserved indicates the success of their efforts.



Atlantic City Auditorium*

Nineteenth National Metal Congress and Exposition

THE Nineteenth National Metal Congress and Exposition, in which five great technical societies are co-operating in presenting, for the benefit of American Industry, is to be held in the Atlantic City Auditorium, Atlantic City, New Jersey, October 18 to 22 (inclusive), 1937. These five societies are as follows: American Society for Metals, American Institute of Mining and Metallurgical Engineers, American Welding Society, American Society of Mechanical Engineers, and The Wire Association.

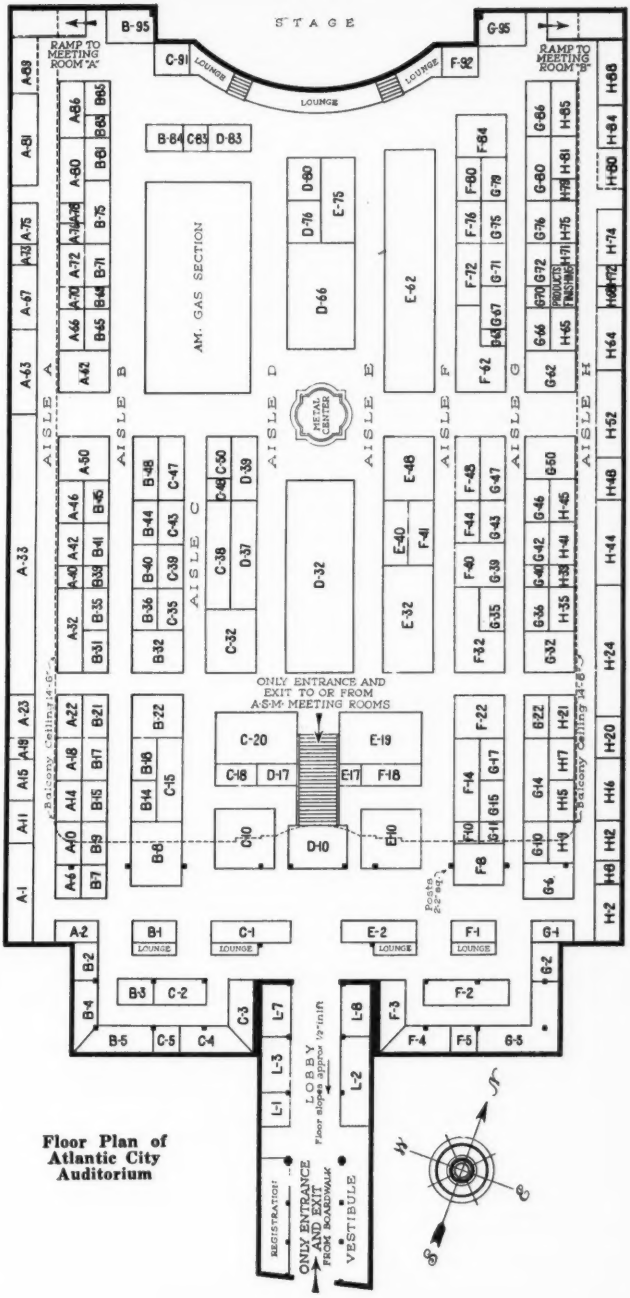
Included in the membership rosters of these five societies are scientists, engineers, and technicians who are most largely responsible for the factors of safety, performance, high production and corresponding low cost which are the outstanding characteristics of American metal manufacturing. It has been in their laboratories that these men have been working for the past twelve months developing new metals or new methods of processing the metals now in use. The National Metal Congress affords these men one time in the year when they leave their laboratories and get together to compare notes and report on the developments that have taken place and the results that have been attained since their last meeting. In addition to presenting these scientists, engineers, and technicians, together, this convention will afford an opportunity for all others who are interested in the scientific side of metal manufacturing to bring their knowledge up to date.

Included in the American Society for Metals program is a two-

*(Skyview Courtesy of H. H. Harris, President, General Alloys Corp.)

day symposium on carburizing, with fourteen technical sessions. Thirty other papers on a variety of metal subjects are also being presented. Two lecture courses will occupy the hours of late afternoon and evening, one comprising a comprehensive five-lecture series on steel making and the other consisting of three lectures on metallographic technic. These lecture courses will be presented by men who are acknowledged peers on these subjects.

A round table discussion on "Physics of Metals", a technical session, and the



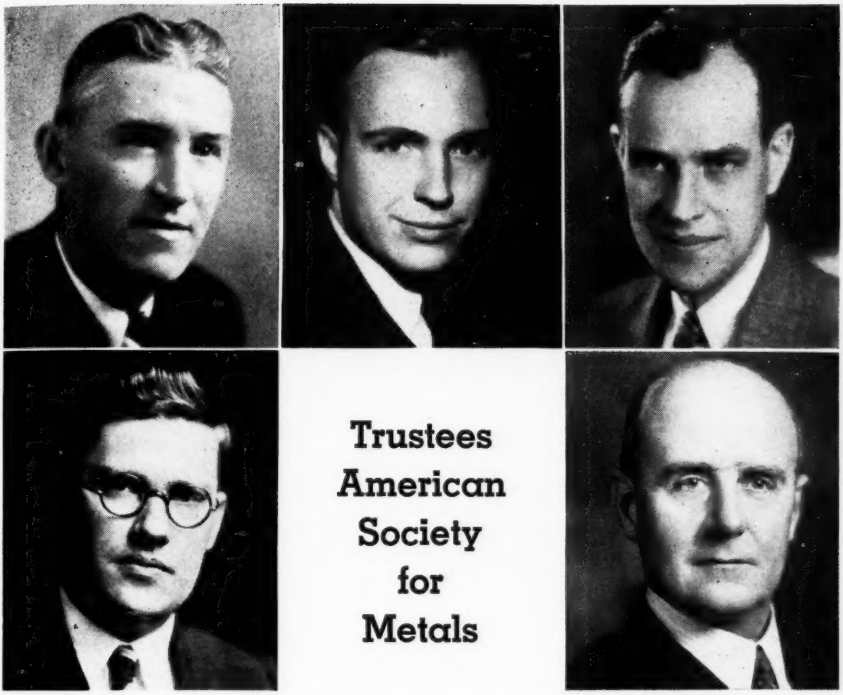
Floor Plan of Atlantic City Auditorium

annual "Science Lecture" of the A.I.M.E. which this year deals with "The Behavior of Gases on Metal Surfaces" will be included on the program of the American Institute of Mining and Metallurgical Engineers. A joint sponsorship of the round table discussion by the A.I.M.E., A.S.M., A.S.T.M., and American Institute of Physics promises a wide range of viewpoint and opinion. Other technical sessions will be devoted to general metallurgy, metallography, and open hearth practice.

The American Welding Society has arranged a well-balanced technical program with sessions on both industrial and fundamental research in welding. Other aspects of welding which will form the subject of separate sessions are Fabrication by Welding, Shipbuilding, Welding on Railroads, and Welding of Alloy Steels. The Fundamental Research Committee will again meet to discuss work done and plan future projects. A one-day program presented jointly with the American Welding Society in which the mechanics of welding and the relation of design to welding will be featured with the American Society of Mechanical Engineers. This will undoubtedly prove to be very interesting and provide valuable discourse on a very important subject.

The Wire Association will have the usual informal discussions and the Association's headquarters at the Ambassador Hotel will be open from 9 a. m. to 11 p. m. daily for this purpose. A varied group of papers will also be presented at the daily technical sessions. The subjects featured in the Ferrous Division will include Fatigue of Springs, Pickling, Cold Heading, Grain Growth, and Galvanizing. The Non-Ferrous Section will have the opportunity to listen to papers and discussions on the Production of Copper, Fourdrinier Wire, and Copper in Apparatus Manufacture.

The National Metal Show will include displays of more than 225 leading industrial organizations among which will be actual operating exhibits showing the newest developments in plant and research equipment. Every aisle in the huge auditorium will be lined with exhibits representing the most modern ideas in metal research, and in attendance at each exhibit will be metal and equipment experts who will be there to answer questions about their products. Altogether, this National Metal Congress and National Metal Show will provide the one opportunity of the year



Trustees American Society for Metals

(Above) R. L. Wilson, *Timken Steel & Tube Company*; R. S. Archer, *Republic Steel Corporation*; S. C. Spalding, *American Brass Company*.
(Below) R. L. Kenyon, *American Rolling Mill Company*; O. W. Ellis, *Ontario Research Foundation*.

for the engineer or manufacturing executive to obtain, firsthand, answers to the problems which have confronted him during the past twelve months. The five technical societies listed above have combined to invite the visitor to the Show to bring his problems with him and will be only too glad to see that he meets the men who can give him the right answers.

Here will be an opportunity to discuss, with the foremost engineers of the country, problems of welding, manufacturing, heat treating, plating, finishing, and other problems of metal manufacturing.

Registration is the only requirement for admission to the National Metal Congress and National Metal Show for any engineer, technician or executive engaged in any phase of the metal industries.

LIST OF EXHIBITORS

at the

NATIONAL METAL SHOW

Ajax Electric Co., Inc.

Philadelphia.

Booth D-37

In attendance: G. H. Clamer, president; William Adam, Jr., vice president; J. E. Haig, secretary; Axel Hultgren (Stockholm); A. A. Anderson, Cleveland representative; E. E. Bolds, Cleveland representative; E. L. Barker, New England representative; C. A. Hooker, Michigan representative; and G. A. Ledebur, Pennsylvania and New York representative.

Exhibiting (in operation): Salt bath furnaces (Ajax-Hultgren type) for cyaniding, carburizing, annealing, and tempering. Also an Ajax-Hultgren furnace for hardening high speed steel. Products heat-treated in Ajax-Hultgren furnaces. Display of photographs showing various types of Ajax heat treating furnaces.

Ajax Electrothermic Corp.

Trenton, N. J.

Booth D-37

In attendance: Dr. G. H. Clamer, president and general manager; Dr. E. F. Northrup, vice president and technical adviser; Dudley Willcox, treasurer and assistant general manager; Robert N. Blakeslee, Jr., secretary and sales manager; George F. Applegate, superintendent; Frank T. Chesnut, electrical engineer: A. Dean Meyer, sales metallurgist; Harry G. Remmers, electrical engineer; Theodore R. Kennedy, development engineer; and Thomas A. Feehan, chief draftsman.

Exhibiting (in operation): Ajax-Northrup furnaces will be operated from 60 kw. high frequency generator. Two pipes will be heated simultaneously in an oval coil. Round bars will be surface heated and square and round bars will be heated through the center while hot and visible. A melting furnace will be heated to illustrate use of same high frequency for both melting and heating for forging, etc. Continuous heating of pipe for normalizing will be demonstrated. A color movie of bar being heated to forging temperature will be shown continuously. Intricate stainless and alloy castings made from Ajax-Northrup melting furnace will be on display.

Allegheny Steel Co.

Brackenridge, Pa.

Booth G-47

In attendance: V. B. Browne, vice president in charge of research; C. A. Scharschue, director of research; V. N. Krivobok, associate director of research; W. J. McArdle, general sales manager; R. M. Allen, assistant general sales manager; W. R. Grunow, engineer; F. L. Kennedy, manager, New York office; F. P. Norris, manager, Philadelphia office; W. R. Murphey, sales engineer; and C. W. Green, advertising manager, (in charge of exhibit).

Exhibiting: An interesting display of Allegheny Metal. The center section is a steel mill scene painted in several planes to give a three dimensional appearance. In the foreground is a mechanized stamping machine out of which come finished products made from Allegheny Metal.

American Car and Foundry Co.

New York.

Booth G-15

In attendance: F. C. Cheston, sales agent; H. C. Cheston, sales agent; and W. J. Bisset.

Exhibiting (in operation): Electric Heater for heating rivets; Horizontal Type "C" Heater for heating valve and similar stock; Combination L/LA Forging Heater for heating for forging and upsetting; and Six-Foot Bar Heater for heating bar stock. A demonstration of fast production at low cost with clean, instantaneous heating will be given with these heaters.

American Coach & Body Co.

Cleveland.

Booth A-73

In attendance: M. L. Eckman, chief engineer; and Vladimir Prech, operator.

Exhibiting (in operation): Portable, flexible, and adaptable spot welder of 75 KVA capacity.

The American Foundry Equipment Co.

Mishawaka, Ind.

Booth B-40

In attendance: L. L. Andrus, sales manager; A. E. Lenhard, advertising manager; and C. F. Ludwig, sales engineer.

Exhibiting (in operation): A cabinet containing an animated model of our "Wheelabrator" abrasive blasting unit (half size) to show clearly how it operates. This model with a full size "Wheelabrator" unit will be the focal point in the exhibit.

A large map of the United States showing each of our installations.

Illuminated illustrations of each of our Wheelabrator machines on "translite film" and large photographs of typical installations will also be shown.

Samples of metal products cleaned by "Wheelabrating."

American Gas Furnace Co.

Elizabeth, N. J.

Booth, Gas Section

In attendance: P. C. Osterman, vice president; Elmer C. Cook, sales manager; George A. F. Machlet, John Mehrman, Theodore Farwick, Sr., Gustav Schwab, Porter Hurd, William J. Barenscheer, S. P. Rockwell, W. A. Stumpf, and Kenneth Stumpf.

Exhibiting (in operation): A small reciprocating full muffle continuous heating machine for clean hardening using whatever gaseous atmosphere may be desired.

Improved pot hardening furnace with latest type lining and insulation, numerous small burners for uniform heating and quiet operation distributed about the upper part of the furnace, which is arranged with down draft.

A small bell retort furnace for carburizing, nitriding, "Ni-Carbing," clean hardening, bright annealing and, in fact, any exacting heat treating work.

A new improved school shop table with a combination forge and oven furnace and a small pot furnace for lead or salt bath heat treating or cyaniding, or, if so desired, for aluminum melting, which is becoming so popular in the vocational schools.

One of our latest over and under fired oven furnaces with bottom vent and automatic vent closures and atmosphere adjusting burners actuated by the door mechanism.

A display of many different types of blowpipes and special burners which may be used with city gas, natural gas, or bottled gas. Photographs.

American Machinist and Product Engineering Co.

New York.

Booth G-1

In attendance: Mason Britton, vice-chairman; Kenneth H. Condit, editor, American Machinist; F. H. Colvin, editor, American Machinist; John Haydock, managing editor, American Machinist; George F. Nordenholt, editor, Product Engineering; W. E. Kennedy, manager; and James A. McGraw, eastern manager.

Exhibiting: Educational material, featuring the service of American Machinist and Product Engineering to the metal-working industry.

Photographs.

American Metal Market, New York.

New York.

Booth G-70

In attendance: S. P. Trench, vice president; R. A. Langer, secretary; S. Glassford, circulation manager; and M. H. Stocking, Cleveland representative.

Exhibiting: The pioneer daily newspaper of the iron, steel and metal working industries. Established in 1882 as a weekly. Published daily since 1899. Publishing daily market reports, prices, and news developments affecting the iron, steel and metal fields.

Ampco Metal, Inc.

Milwaukee.

Booth H-2

In attendance: R. W. Uecker, secretary-treasurer; J. D. Zaiser, sales engineer; R. T. Stone, Philadelphia representative; and H. C. Haines, New York representative.

Exhibiting: Various parts showing the uses of Ampco Metal, an extremely wear-resistant alloy of copper, aluminum, and iron. Available in sand castings, individual centrifugal castings, rolled and forged material. Some of the parts to be displayed will include gears, bushings and bearings, acid resistant equipment, feed nuts, welding jaws, non-sparking safety tools, and forming and drawing dies.

Castings of Ampco Beryllium-Copper and of hard high conductivity alloy for electrical service.

Arcos Corp.

Philadelphia.

Booth B-2

In attendance: R. D. Thomas, president; H. E. Hopkins, treasurer; D. D. Wachter, sales manager; T. H. Nelson, sales; F. S. Tate, sales; and A. M. Taylor, superintendent.

Exhibiting (in operation): Welded stainless and welded non-ferrous products fabricated with Arcos special electrodes. We will operate a test showing corrosion resistance of 19/9 chrome-nickel weld metal.

Armstrong Cork Products Co.

Lancaster, Pa.

Booth G-46

In attendance: F. M. Ritts, Mark Jenkins, Milton Hoff, B. W. Adams, Peter Gates, L. W. Bertelson, John Seanor, Spy Blythe, Ed Tanguy, A. Smith, S. Ireys, and W. W. Herrold.

Exhibiting (in operation): Various types of brick and the materials which are used in the manufacture of these bricks. Two furnaces will be operated, attached to potentiometers, to show the comparative values of competitive bricks.

Automatic Temperature Control Co., Inc.

Philadelphia.

Booth B-65

In attendance: G. H. Johanson, president; J. D. Andrews, sales manager; R. A. Smart, advertising manager; H. Wetter, district manager, Philadelphia; Walter Goehring, vice president; Walter C. Kennedy, assistant sales manager; O. W. Stowe, development; and W. C. Bellis, district manager, New York City.

Exhibiting (in operation): In addition to standard industrial timers and motor operated controllers, equipment to be shown for the first time is as follows:

Motor operated controllers—Relatrol, Type 3, Model D, with saturex relay—no moving parts, independent of vibration. Balancer, Type 3, Model E, with magnetic mercury bottle relay-inclosed, non-chattering contacts. Two position, Type 1, Model C, for slip stem valves generating 2000# push or pull, 15 second, 2½ inch stroke. Floating, Type 400, Model C, for large rotary stem valves and dampers. Timers—Time reverser for regenerative furnaces, Type 2300-35. Time independently adjustable for both left and right end firing. Electric furnace, 3 position, Control Type 2625, Model H7. Electric furnace balancer, Control Type 2610, Model R.

Barrett-Cravens Co.

Chicago.

Booth A-10

In attendance: E. J. Heimer, vice president; C. E. Barnes, Eastern district manager; and J. L. Hunt, Philadelphia representative.

Exhibiting (in operation): A complete line of hand and electrically operated portable elevators for the piling of materials ceiling high thus utilizing all overhead space and having available for more productive purposes the additional floor space.

Hand operated Barrett lift-trucks—which eliminate unnecessary handling and rehandling, loading and unloading of material and hence effect a considerable savings in time, money and labor.

Barrett barrel trucks; Barrett drain racks; and Barrett storage racks.

The Bellis Heat Treating Co.

Branford, Conn.

Booth A-2

In attendance: A. E. Bellis, president; and W. J. Holcomb, manager.

Exhibiting (in operation): Lavite heat treating baths for hardening; tempering; annealing; and case hardening.

Bellis lavite electric furnace for heating automotive steels, tool steels, including high speed steels, and non-ferrous alloys.

Bethlehem Steel Co.

Bethlehem, Pa.

Booth D-66

In attendance: T. G. Foulkes, metallurgical supervisor; J. K. Killmer, chief of contact, metallurgical department; T. D. Shannahan, metallurgical department; J. C. Crook, metallurgical department; M. C. McFadden, metallurgical department; K. H. Read, metallurgical department; L. H. Vanatta, metallurgical department; G. M. Huck, metallurgical department; R. C. Snyder, metallurgical department; A. D. Shankuand, engineer of tests; J. H. Stoll, assistant engineer of tests; M. W. Dalrymple, metallurgical supervisor; E. Guerney, metallurgical department; H. B. Bent, engineer of tests; J. F. Cotton, metallographist; W. J. Curry, contact man; H. J. Cutler, engineer of tests; C. T. Ward, assistant superintendent, rod and wire mill; J. C. Siebert, metallurgist; J. D. Schafer, superintendent Harlan Plant; E. C. Raysor, engineer of tests; C. H. Herty, research engineer; J. L. Gregg, research engineer; A. C. Chamberlain, assistant to manager development and research department; C. Schenck, engineer of development; S. Epstein, patent attorney; E. F. Kenney, metallurgical engineer; P. E. McKinney, metallurgical engineer; Henry Wysor, metallurgical engineer; L. H. Winkler, metallurgical engineer; W. R. Shimer, metallurgical engineer; A. P. Spooner, metallurgical engineer; G. F. Hocker, manager of sales; F. H. Baldwin, salesman; E. A. Buxton manager of sales; D. A. St. Clair, salesman; R. S. Tucker, manager of sales; E. A. Gumbart, salesman; L. R. Steuer, manager of sales; G. B. Troxell, salesman; J. C. Long, manager of publications; S. H. Yorks, advertising department; and A. A. Warg, advertising department.

Exhibiting (in operation): Talking towers with physical property charts, fractures, and photomicrographs will describe and show the effect of heat treatment on carbon, manganese, nickel, nickel-chrome, molybdenum, and spring steels.

A working model of the electric furnace heat treatment department with accompanying transparencies of views inside the plant.

A display of fractures and photomicrographs showing the effect of finishing temperatures and methods of cooling on hot rolled steels.

Tempered sheets with a range of temperatures showing the hardness effect on the samples.

The Bristol Co.

Waterbury, Conn.

Booth G-66

In attendance: H. L. Griggs, vice president and sales director; L. G. Bean, sales manager; H. E. Beane, field sales manager; F. W. Borchers, Philadelphia district manager; G. H. Gaites, Pittsburgh district manager; C. Webber, New York district manager; E. R. Wyatt, manager sales engineering department; G. P. Lonergan, sales promotion department; and W. B. Scott, sales engineer.

Exhibiting (in operation): Instruments developed for use in the metals industry will be featured, consisting of a new line of Pyromaster pyrometer recorders and controllers. These instruments use the potentiometer method of measuring electromotive force in terms of temperature, using standard thermocouples and extension leads—operating on a new and simplified principle. They are not affected by plant vibration; require no lubrication, and there is no mechanical motion of any kind, except when a change in the measured temperature takes place. Controllers are of either the electric or air-operated type.

Bristol's system of coordinated process control will demonstrate the multiple-cam cycle controller for operating valves, pumps, blowers, dampers and electrical equipment. Such variables as temperature, pressure, liquid level, flow and machine speeds are automatically controlled. The system is extremely flexible in adaptation to a variety of combinations, for many different types of processes and industries.

A new electric flow meter will also be on display. This instrument measures the flow of steam, liquids and gases through a closed line, and for transmitting the reading to a point remote from that of measurement, for recording on a chart or indicating on a scale, or for automatic remote control. The new electric flow meter operates on Bristol's Metameter principle of telemetering, consisting of: (1) a transmitter for measuring the differential pressure across an orifice plate, venturi tube or flow nozzle, and for telemetering the reading, (2) a receiver for recording the measured values in rate of flow and totalizing by means of a new electric integrator with index counter, also a recent development.

Bristol's new Electronic Instagraph, for accurately recording rolling mill temperatures, will also be demonstrated. It consists of three units: (1) a thermo-photronic tube, (2) a potentiometer amplifier and, (3) a recording instrument. The photronic cell in the tube or "gun" is affected by the thermal

Always in Style

HILO

BLACK ENAMELS & JAPANS

Color fashions come and go—in manufacturers' products as well as ladies' dresses—but year after year there is a steady demand for Black Enamels and Japans.

Hilo Blacks are a better buy than ever today, for the Hilo "Better the Finish" Laboratory has constantly improved the old standbys and created new ones to meet new demands. No matter what your requirement, there is a Hilo Black that will fill it perfectly.

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BOSTON **CHICAGO**

Gentlemen: We'd like a copy of the revised bulletin "Black Enamels and Japans" and sample (type checked) for use on

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Low Bake	**Dull**	**Brushing**
High Bake	**Semi-Gloss**	**Dipping**
Time	**Gloss**	**Roller Coating**

Company .....

By..... Title.....

Address .....

City..... State.....

spectrum only, radiated from a heated body when the "gun" is "aimed" at the mass. An instantaneous reading of the temperature is thus obtained and recorded on a strip chart. The small electromotive force generated by the photronic cell is potentiometrically measured, amplified and recorded by the Instagraph in terms of temperature. Because of the high sensitivity of the instrument and speed of response to changes in temperature, it is especially adapted for use in measuring the temperature of moving bodies.

Other instruments to be exhibited include Bristol's low range draft recorder controller; wide strip potentiometer pyrometer controller; ampliset free vane pneumatic pressure controller; mercury switch temperature controller; indicating pyrometer controller with enclosed mercury switch; multiple-point pyrometer indicator with rotary switch; pyrotrol for automatically lighting and protecting gas-fired industrial furnaces and heaters from explosions due to pilot light failure; and B-Linator for closer temperature control on new and old installations.

The Brown Instrument Co. Division of Minneapolis-Honeywell Regulator Co.

Philadelphia.

Booth B-75

Exhibiting (in operation): Brown multiple-recording and controlling potentiometer pyrometer; Brown electr-o-line automatic temperature control; Brown analy-graph; Brown radiomatic pyrometer; Brown multiple point recording controlling potentiometer pyrometer; Brown air-o-line potentiometer; Brown optimatic temperature recorder; and Brown area flow meter.

The Carborundum Co.

Niagara Falls, N. Y.

Booth H-24

In attendance: S. F. Courter, assistant to sales manager; F. Tone, Jr., assistant to sales manager; B. H. Work, sales engineer; A. Prey, sales engineer; W. J. Griffith, district sales manager, Philadelphia; O. C. Dobson, district sales manager, Pittsburgh; J. C. Gallen, sales representative; Geo. B. Detwiler, sales engineer; H. J. Wills, sales engineer; W. T. McCargo, sales engineer; F. D. Bowman, advertising manager; J. C. Rice, exhibits department; and J. E. Rice, exhibits department.

Exhibiting: Complete exhibit of abrasive and refractory products relating to the metal industry. Latest models of Carborundum Brand Hutton honing precision machines. Globar non-metallic electric heating elements.

Climax Molybdenum Co.

New York.

Booth C-15

In attendance: Max Schott, president; J. B. Thorpe, vice president; Alan Kissock, vice president; C. M. Loeb, Jr., vice president; W. P. Woodside, vice president; T. D. Parker, metallurgical engineer; V. A. Crosby, metallurgical engineer; G. O. Loeffler, metallurgical engineer; A. J. Herzig, chemical metallurgist; R. Parke, metallurgist; J. Robb, metallurgical engineer; J. Wilson, metallurgical engineer; P. M. Snyder, metallurgical engineer; and E. R. Young, metallurgical engineer.

Exhibiting: Photographs.

Continental Machine Specialties, Inc.

Minneapolis.

Booth B-18

In attendance: J. W. Wilkie, vice president; Floyd Hooper, advertising manager; D. A. Moreinis, New York office; and L. A. Peirez, New York office.

Exhibiting (in operation): The Doall contour machines will be shown in operation. In the booth will be a Metalmaster model and the standard model "J." All functions of the machine, including sawing, filing and polishing, will be demonstrated. Materials worked on will include tool steels, mild steel, aluminum, copper, brass, alloys, as well as asbestos, hard rubber, carbon and plastics, such as bakelite, plexiglass and lucite. Also on display will be representative examples of special parts, dies, templates, cams, jigs and special tools.

Crown Rheostat & Supply Co.

Chicago.

Booth F-92

In attendance: G. A. Spencer, president; G. E. Huenerfauth, vice president; and F. P. Green, sales.

Exhibiting (in operation): Plating barrels, dryers, polishing lathes, rheostat, polishing wheels, and nickel anodes.

Daily Metal Trade.

Cleveland.

Booth L-2

Exhibiting: See Penton Publishing Co.

A. P. de Sanno & Son, Inc.

Philadelphia.

Booth H-15

In attendance: R. A. Burton, vice president; J. C. Rinehart, sales manager, grinding wheels; S. M. Hershey, production manager; L. Buckingham, chemist; B. G. Hardy, engineering department; and V. Collajezzi, engineering department.

Exhibiting (in operation): Type C, J, and F Radiac cut-off machines demonstrating the cutting of steel and other metals using abrasive disks. Also line of small grinding wheels, mounted wheels, and cutting off abrasive disks.

Detroit Testing Machine Co.

Detroit.

Booth H-39

In attendance: Ralph Campbell, partner; and Fred H. Nass, partner.

Exhibiting (in operation): Complete line of testing machines including: Direct reading power Brinells; hand operated Brinells; ductility testers; tensile and universal testing machines.

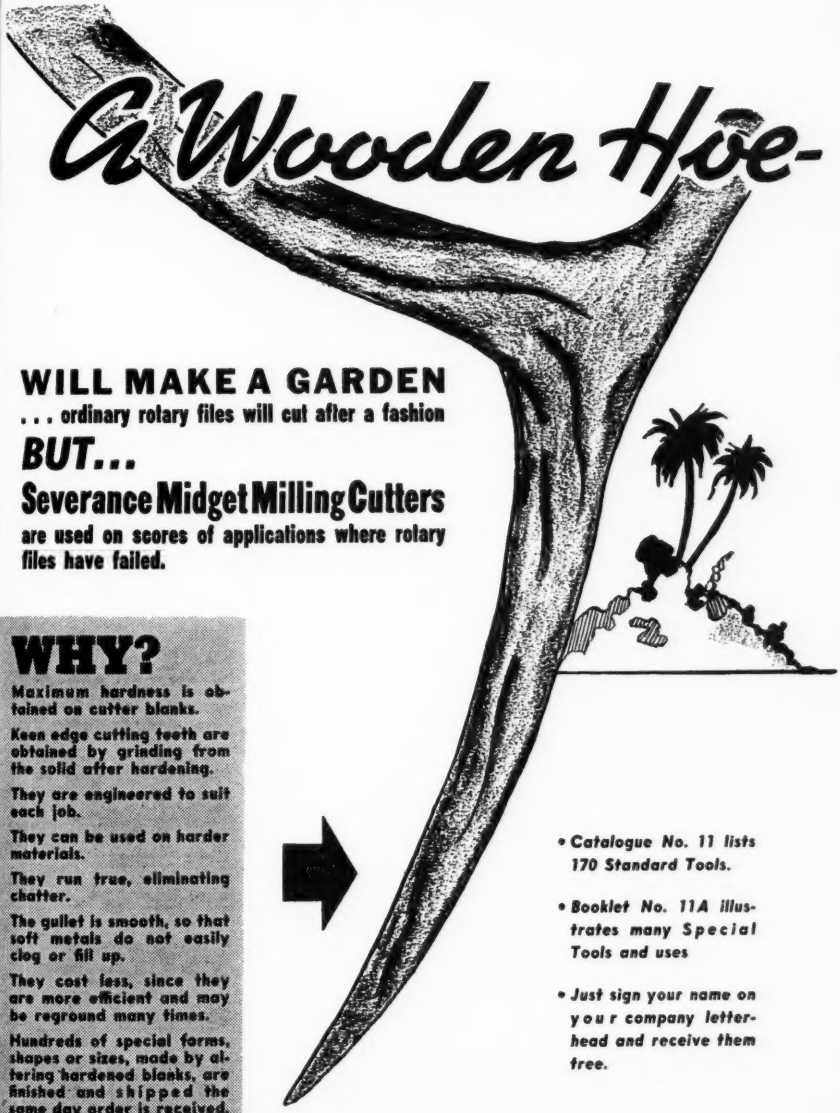
The Electric Furnace Co.

Salem, Ohio.

Booth D-80

In attendance: R. F. Benzinger, president; F. T. Cope, general manager; A. H. Vaughan, chief engineer; C. L. West, sales engineer; K. U. Wirtz, sales engineer; C. H. Vaughan, sales engineer; N. H. Knowlton, sales engineer; G. P. Lozier, superintendent; S. J. Eberwein, assistant superintendent; B. C. Thompson, Detroit district representative;

A Wooden Hoe-



WILL MAKE A GARDEN

. . . ordinary rotary files will cut after a fashion

BUT...

Severance Midget Milling Cutters

are used on scores of applications where rotary files have failed.

WHY?

Maximum hardness is obtained on cutter blanks.

Keen edge cutting teeth are obtained by grinding from the solid after hardening.

They are engineered to suit each job.

They can be used on harder materials.

They run true, eliminating chatter.

The gullet is smooth, so that soft metals do not easily clog or fill up.

They cost less, since they are more efficient and may be reground many times.

Hundreds of special forms, shapes or sizes, made by altering hardened blanks, are finished and shipped the same day order is received.

- *Catalogue No. 11 lists 170 Standard Tools.*
- *Booklet No. 11A illustrates many Special Tools and uses*
- *Just sign your name on your company letterhead and receive them free.*

SEVERANCE TOOL MFG. CO.

Plant and Main Offices, 1516 E. GENESEE AVE., SAGINAW, MICH.

V. A. Hain, Chicago district representative; and A. E. Wright, advertising manager.
Exhibiting: Photographs of recent installations and new developments in special atmosphere equipment for copper brazing, scale-free heat treating and bright annealing ferrous and non-ferrous products including wire, sheet, tubing, strip, stampings, bolts, and automotive parts; also samples of material treated in these furnaces. Photographs of outstanding electric, oil, and gas fired furnaces for normalizing, carburizing, nitriding, forging, annealing and other heat treating processes; also our new gas fired radiant tube furnaces and Elfurno special atmosphere generators.

Automatic Gasflux Inc.
Cleveland.

Booth A-78

In attendance: W. L. Ulmer, president; and C. A. Medsker, chief engineer.
Exhibiting (in operation): A demonstration of bronze welding with new type of flux injected into the gas stream. This is the new process recently developed and will be shown at the show for the first time. All that is required is a portable fluxer, with cylinder, acetylene, and oxygen. Also a demonstration of Ferrolene gas cutting with a machine torch.

The J. B. Ford Sales Co.
Wyandotte, Mich.

Booth G-43

In attendance: B. N. Goodell, manager, industrial department; W. M. Cole, assistant manager, industrial department; W. B. Davison, manager, Philadelphia office; L. D. Dodson, manager, New York office; H. J. Perry, industrial representative, Philadelphia; and C. L. Southwick, industrial representative, Detroit.
Exhibiting: Complete display of Wyandotte specialized metal cleaners for plating, lacquering, enameling, japanning, and vitreous enameling. For use in still solutions, electric cleaning solutions, metal parts washing machines, tumbling barrels, and spray gun equipment. For cleaning before bonderizing, anodizing, hot tinning, galvanizing, and assembling. For removing lacquer, japan, carbonized mineral oils, and fabricating compounds. Wyandotte burnishing compounds for all burnishing problems. Wyandotte neutralizers for neutralizing acid after pickling operations. Wyandotte specialized cleaners for cleaning railway equipment, aeroplane, and automotive equipment.

General Alloys Co.
Boston.

Booth E-10

In attendance: H. H. Harris, president; G. C. McCormick, vice president; R. D. Alger, general superintendent; W. R. Blair, engineer; A. E. Painter, New York representative; Ralph Hare, New England representative; W. J. Fitzpatrick, Philadelphia representative; Roy E. Lynd, Buffalo representative; H. G. Chase, Ohio district manager; A. L. Grinnell, Detroit sales manager; J. R. Heckman, Chicago district sales manager; J. J. Donovan, Chicago sales representative; and W. F. Bender, chemical industry representative.
Exhibiting: Nickel-chromium alloys, Q-Al-loys; carburizing and annealing containers; cyanide and lead pots, furnace hearths, roller rails, heat and acid resisting chain; cyanide dipping baskets, recuperators, miscellaneous furnace parts, parts for every type heat treating furnace—carburizing, annealing, normalizing, hardening, tempering, forging, spheroidizing, tubes and retorts, corrosion and abrasion resisting castings.

Grob Brothers.
Grafton, Wis.

Booth G-75

In attendance: Benjamin Grob, partner; and Theodore Grob, partner.
Exhibiting (in operation): Metal cutting open end band saw, 19 in. throat; metal cutting open end band saw, 36 in. throat; heavy duty continuous motion Grob filing machine; light duty continuous motion Grob filing machine; and metal butting band saw, 14 in. throat with electrical brazing device.

Harnischfeger Corp.
Milwaukee.

Booth C-1

In attendance: J. C. Joublanc, chief metallurgist; G. W. Hoskins, sales engineer, Philadelphia office; U. V. Westover, sales engineer, New York office; F. Leslie, sales engineer, New York office; L. M. Stout, district manager, Philadelphia; J. P. Morrissey, welding rod sales manager; and H. R. Noble, sales engineer, New York office.
Exhibiting (in operation): P & H Hansen Smootharc welders using Smootharc welding electrodes.
Introduction of the new P & H electric hoist with variable speed push button control—one ton capacity.
The popular 250 pounds capacity Zip-Lift Electric Hoist.
Entire display of the Smootharc electrodes showing their physical characteristics.

C. I. Hayes, Inc.
Providence, R. I.

Booth B-31

In attendance: C. I. Hayes, president; J. E. Hines, sales manager; W. R. Gilbert, chief engineer; C. G. Paulson, sales engineer; R. W. Pettigrew, service engineer; C. A. Hooker, Detroit representative; E. F. Burke, Cleveland representative; R. G. Hess, New York representative; J. E. Figner, Pittsburgh representative; R. A. Sembower, Pittsburgh representative; and F. A. Seeger, Atlanta, Ga., representative.
Exhibiting (in operation): Type HG-52 atmosphere controlled tool hardening furnace—non-operating. Type LR-51 atmosphere controlled tool hardening furnace—non-operating. Type A-3 atmosphere controlled tool hardening furnace — operating. External combusted gas atmosphere generator, non-operating.

Hevi Duty Electric Co.
Milwaukee.

Booth F-41

In attendance: L. W. Hayden, district manager, New York; J. S. Ayling, district manager, Cleveland; C. A. Chutter, district manager, Chicago; H. E. Koch, vice president, Milwaukee; E. L. Smalley, president.

Milwaukee; and A. H. Oberndorfer, advertising manager, Milwaukee.
Exhibiting (in operation): Industrial and laboratory electric heat treating furnaces.

Hobart Brothers Co.

Troy, Ohio.

Booth C-38

In attendance: E. A. Hobart, president; W. H. Hobart, vice president; O. H. Menke, factory manager; E. C. Galbreath, general sales manager; W. J. Chaffee, welder sales manager; E. K. Butterfield, welder sales; Dorsey C. Anderson, Philadelphia distributor; H. P. Gordon, New York City distributor; Leo Gordon, Boston distributor; J. Rosencrans, New York City distributor; and Henry Wehrheim, Newark, N. J., distributor.
Exhibiting (in operation): A full line of Hobart "simplified" arc welders, including models for welding light gauge sheet metal as well as for heavier work. The new Hobart magnetic type motor horsepower control will be demonstrated in connection with electric motor driven models. Complete gasoline engine driven equipment and generators only for belt or coupling operation. Provision will be made for demonstrating the equipment on various kinds of work and with various types of electrodes.

A. F. Holden Co.

New Haven, Conn.

Booth B-32

In attendance: A. F. Holden, F. J. Enright, and others.
Exhibiting (in operation): One electrode and three gas furnaces. All automatic controls.

Illinois Testing Laboratories, Inc.

Chicago.

Booth B-83

In attendance: M. D. Pugh, sales manager; J. H. Torrey, New York representative; C. A. Hooker, Detroit representative; and R. W. Bergen, Philadelphia representative.
Exhibiting (in operation): Complete line of portable and wall type indicating pyrometers, resistance type thermometers, instantaneous direct reading air velocity meters, electronic type pyrometer controller and accessories.

Industrial Heating.

Pittsburgh.

Booth A-76

Exhibiting: See National Industrial Publishing Co.

Industrial Publishing Co.

Cleveland.

Booth F-4

In attendance: Irving B. Hexter, president; and Lester P. Aurbach, vice president.
Exhibiting: Descriptive material on the advances in the use of welding and its acceptance in fabricating metal.

The International Nickel Co.

New York.

Booth E-75

In attendance: T. N. Armstrong, H. Beasley, E. J. Bothwell, C. E. Brinker, D. A. Curry, O. B. J. Fraser, H. J. French, George Geiger, Harold Geiger, E. J. Hergenroether, Wm. J. Kirk, F. L. LaQue, H. Larsen, H. S. Lewis, Charles McKnight, C. R. McGrail, A. C. Meyers, D. A. Nemser, N. B. Pilling, J. W. Sands, H. E. Searle, G. W. Strahan, J. S. Vanick, F. J. Walls, R. A. Wheeler, and T. H. Wickenden.
Exhibiting (in operation): Samples of the commercial applications of the nickel alloy steels, nickel cast irons, Ni-Resist, Ni-Hard, nickel-bronze and other nickel-containing alloys.

The Iron Age.

New York.

Booth H-16

In attendance: F. J. Frank, president; J. H. Van Deventer, editor; C. S. Baur, general advertising manager; C. E. Wright, managing editor; T. W. Lippert, metallurgical editor; R. E. Miller, machinery editor; F. J. Oliver, associate editor; H. E. Leonard, assistant advertising manager; O. L. Johnson, research manager; Emerson Findley, Cleveland representative; B. L. Herman, Philadelphia representative; H. K. Hottenstein, Chicago representative; Peirce Lewis, Detroit representative; C. H. Ober, New York representative; W. B. Robinson, Pittsburgh representative; D. C. Warren, New England representative; A. H. Dix, circulation manager; S. I. De Wolf, field circulation representative; and F. W. Vanderhoff, field circulation representative.

Jessop Steel Co.

Washington, Pa.

Booth G-10

In attendance: R. E. Emery, president, Jessop Steel Company; F. T. H. Youngman, vice president and treasurer; H. E. Doughty, Philadelphia sales representative (in charge); R. M. Paxton, New York branch manager; and T. S. Fitch, manager, Composite Steel Division.
Exhibiting (in operation): Stainless steel in various finishes to show the applicability to decorative work.
A small press will be in operation to show the severe abuse that a die and punch must withstand. Movies of a general nature and of specific operations such as inspection and testing. A series of photographs indicating the importance of tool steel in the average citizen's everyday life. A variety of tools and products.
The evolution of a stainless steel knife from electric furnace to final application. The evolution of a composite high speed steel hack saw. The evolution of a 3-ply silverbond composite stainless steel frying pan.
A "memory" contest in which the winners will be awarded prizes each day will also be a feature.

The C. M. Kemp Mfg. Co.

Baltimore.

Booth, Gas Section

In attendance: W. S. Bassett, sales engineer; J. P. Flippen, district representative; Wm. Hunt, development engineer; W. M. Ponder, sales engineer; R. S. Van Note, sales engineer; and E. B. Dunkak, vice president.
Exhibiting (in operation): The industrial carburetor for premixing air and gas. Gas immersion, soft metal melting equipment. Atmos-Gas producer for the production of conditioned gas for bright annealing. Radiant tube roll heater for preheating hot mill rolls.

Krouse Fatigue Machine Co.
Columbus, Ohio.

Booth F-5

In attendance: G. N. Krouse, president.

Exhibiting (in operation): High speed fatigue machines, 20 in. lb. capacity.
High speed fatigue machines, 100 in. lb. capacity. Testing three sizes of straight shank specimens.
Wire fatigue testing machine.
Thin sheet fatigue testing machine.
Plate fatigue testing machine, capable of testing up to ⅜ in. steel plate.

Ludlum Steel Co.
Watervliet, N. Y.

Booth G-95

In attendance: Members of Ludlum Steel Co. staff; William L. Weaver, stainless castings sales; Truman Brown, special representative; A. W. F. Green, metallurgist; W. H. Wills, metallurgist. Members of Edgcomb Steel Co. staff: Leslie Edgcomb, president; W. H. Franklin, vice president; S. B. Mathews, manager, stainless steel department; G. Peterson, manager, tool steel department; and C. S. Vogel, welding engineer.

Exhibiting: Tool steel, stainless, stainless castings, nitralloy, FCC products.

Machine Design.
Cleveland.

Booth L-2

Exhibiting: See Penton Publishing Co.

Macklin Co.
Jackson, Mich.

Booth B-45

In attendance: C. L. Wiles, G. J. Rooney, and E. E. Halladay.

Exhibiting: Panel background with display of grinding wheels. Large photographs indirectly lighted showing grinding operation.

Magnetic Analysis Corp.
Long Island City, N. Y.

Booth G-63

In attendance: Wm. S. Gould, Jr., vice president; F. O. Fischer, engineer in charge of sales and service; J. D. Wilfong, Jr., sales and service engineer; and Theodore Zuschlag, chief engineer.

Exhibiting (in operation): Magnetic analysis 3 inch dual method equipment for the inspection of steel for its different characteristics completely set up and in operating condition.

Maas & Waldstein Co.
Newark, N. J.

Booth A-6

In attendance: B. D. Sanderson, sales manager; K. W. Berger, sales representative; and E. R. Van Der Hoef, sales representative.

Exhibiting (in operation): A visual presentation of product finishes engineered for specific purposes.

The McKay Co.
Pittsburgh.

Booth H-81

In attendance: Thomas J. McKay, president; Marcus R. Peck, vice president; Frank A. Bond, vice president; James C. McKay, vice president; C. E. Briner, purchasing agent; Fred H. Lewis, plant manager, York, Pa.; Thomas J. McKay, Jr., sales department; M. J. Van Dreser, sales department; L. E. Faulkner, chief chemist; Dr. Davis Helm, research engineer; and John Harris, research engineer.

No equipment will be displayed. Booth will be used to announce the entry of The McKay Company into the arc welding electrode field.

Metals and Alloys.
New York.

Booth L-1

In attendance: H. W. Gillett, [illegible]orial director; E. F. Cone, editor; F[illegible] Peters, assistant editor; P. H. Hubba[illegible]blishing director; W. P. Winsor, busines[illegible] manager; D. B. McIntosh, Eastern advertising manager; G. E. Cochran, Western manager; J. Howard Wilson, district manager; and C. S. Roever, district manager.

Exhibiting: Metals and Alloys, "The Magazine of Metallurgical Engineering." Also, metallurgical books.

Metal & Thermit Corp.
New York.

Booth F-22

In attendance: John B. Tinnon, sales manager; J. H. Deppeler, chief engineer; C. D. Young, Chicago manager; H. T. Thompson, Pittsburgh manager; John Plaskon, sales engineer; E. J. Knapp, sales engineer; C. D. Cooper, sales engineer; and Merritt L. Smith, advertising manager.

Exhibiting (in operation): The complete line of Murex heavy coated electrodes, including the newly developed Murex Genex and Murex Vertex, will be on display. Genex is an all-purpose electrode, specially designed for welding where the fit-up between plates is poor. Vertex is a three-position electrode for flat, vertical or overhead welding. Electrodes will be demonstrated in a welding booth where an expert operator will be in attendance at all times.
In addition, there will be a second booth where frequent demonstrations of Thermit welding will be given and actual welds will be made by the Thermit process.

Michigan Steel Casting Co.
Detroit.

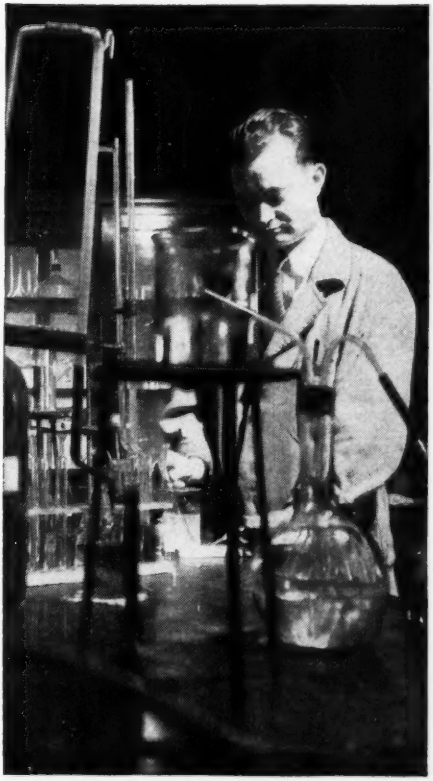
Booths F-40 and G-39

In attendance: E. D. Flintermann, president; J. D. Corfield, sales manager; W. E. Broadbelt, Philadelphia representative; C. B. Kentnor, Jr., New England representative; R. J. Wilcox, metallurgist; W. A. Hakin, sales engineer; and E. A. Christensen, sales representative.

Exhibiting: We will feature centrifugally cast products including stainless steel pipe, carburizing boxes, retorts, cylinder liners. We will also exhibit heat resisting alloy chain and belt conveyors and particularly pusher chain, a recent development of more than usual interest. Also furnace parts and miscellaneous heat and corrosion resistant castings. A comparatively new development which will be shown is a stainless steel or heat resisting alloy conveyor roll made by flash welding stationary cast journals to a centrifugally cast tube.

HOW WILL THE FINISH ON YOUR PRODUCT RESIST THE ATTACK OF

Rust?



THIS is a vital question to the people who buy and use the things you make. Will your products retain their fine appearance throughout their normal period of usefulness? Or will moisture soon set up corrosion — destroying beauty and efficiency?

Do you know just what protection from rust means to your product in extra service? There is an easy way to find out. Parker chemists have tested thousands of products for this very purpose. They have checked and compared and pointed the way to greatly increased finish effectiveness for hundreds of manufacturers.

This laboratory is at your service. Parker technicians serve industry with the most comprehensive experience in corrosion problems and finish utility. Through them you can check your present finishes and learn the increased quality that could be expected with Parker Processes included in your finishing system. Make sure that your finishes protect from rust. Give the customer the greatest possible satisfaction. Testing costs you nothing and you may find a cheaper way to produce a better finish.

PARKER RUST-PROOF COMPANY
2172 E. Milwaukee Avenue
Detroit, Mich.

Ask for These Books:
For more than 22 years, this company has devoted its entire time, talent and energy to the improvement of rust-proofing methods. New books describing the Parker Processes are available to manufacturers and technical men. Send for your copies.

PARKER *Processes* **CONQUER RUST**
BONDERIZING • PARKERIZING

Modern Machine Shop and Products Finishing.

Cincinnati.

Booth H-69

In attendance: Don G. Gardner, publisher; H. Campbell, editor (Modern Machine Shop); F. W. Vogel, managing editor (Products Finishing); J. M. Krings, advertising manager; G. M. Fillmore, Eastern manager; J. Vandervoort, Eastern representative; G. H. Meyers, Western manager; and J. H. Koch, Central Western manager.

Exhibiting: Displays featuring the two publications, Modern Machine Shop and Products Finishing.

Molybdenum Corp. of America.

New York.

Booth C-35

In attendance: M. Hirsch, president; V. R Lansing, vice president; E. A. Lucas, vice president; W. H. Phillips, vice president; N. F. Tisdale, metallurgical engineer; E. Steward, Western sales manager; and H. Furlong, Detroit sales manager.

Morrison Engineering Co.

Cleveland.

Booth C-83

In attendance: J. R. Morrison, president; C. J. Pimsner, vice president; C. A. Litzler, engineer; W. H. Shelton, sales engineer; and G. C. Paxton, production superintendent.

Exhibiting (in operation): Morrison "Flash Baker" for baking wire rods. This baker is a pit-type oven. The top is sealed by high velocity air curtain. The hot air enters the chamber at high velocity and passes directly into coils from both ends, fusing throughout wire strands of the coils. The rods are baked in a few minutes.

The baker is designed for either straight line or circular cleaning line plan, requiring minimum floor space, and economy in operation.

A Morrison welding rod drying unit for baking flux coated welding rods. This unit is an oven made up of individual baking zones, all heated by a Morrison direct gas fired air heater. The heat is separately controlled in each zone to best suit the condition of the rods. The welding rods are conveyed through these zones on specially designed chain, remaining thereon until they emerge from the oven, completely and satisfactorily baked.

This drying unit gives high production, is economical to operate, and requires minimum floor space.

National Industrial Publishing Co.

Pittsburgh.

Booth A-76

In attendance: I. Stanley Wishoski, editor.

Exhibiting: "Industrial Heating"—a monthly publication, devoted to all industrial heating processes, furnaces, ovens, kilns, etc., as used in the manufacture and treatment of iron, steel, non-ferrous metals, glass, ceramic products, etc.

The New Jersey Zinc Co.

New York.

Booth F-32

In attendance: A. E. Mervine, manager, metal sales; W. P. Hardenbergh, assistant manager, metal sales; R. Davison, manager, Market development division, R. G. Kenly, manager rolled metal sales; E. Klein, E. K. Vaughan, C. R. Maxon, S. E. Maxon, W. W. Broughton, H. W. Smith, R. E. Kellers, and A. F. Bremble.

Exhibiting (in operation): Die castings of zinc alloy—both raw and finished—completely assembled products which contain such castings.

Norton Co.

Worcester, Mass.

Booth A-1

In attendance: H. K. Clark, vice president and general sales manager; W. R. Moore, sales manager, abrasive division; W. T. Montague, manager, sales planning and development; A. B. Fritts, publicity manager; I. W. Stanton, exhibit department; Allan Seymour, district manager, Philadelphia; W. J. Bell, sales representative, Philadelphia; A. W. Gough, sales representative, Philadelphia; and J. D. Laughrey, sales representative, Philadelphia.

Exhibiting (in operation): A variety of abrasive products used by industry. The variety of colors resulting from uses of various abrasive and bond combinations for grinding wheels and other abrasive products. By means of a conveyor belt a different group of abrasive products is brought before the audience every 20 seconds. These abrasive products include grinding wheels, many varieties of sharpening stones, abrasive paper and cloth, laboratory ware and refractories, rubbing bricks and sticks, cutting-off wheels, diamond wheels and non-slip flooring materials made of abrasives.

Park Chemical Co.

Detroit.

Booth B-21

In attendance: J. C. Thompson, F. W. Faery, Jr., and J. N. Bourg, vice president and general manager.

Exhibiting: A complete line of hardening and heat treating materials including liquid carburizers, polishing and buffing materials for steels and plated work and grain cement for setting up buffing wheels.

Parker-Kalon Corp.

New York.

Booth 13-21

In attendance: J. J. Mathe, field engineer; and J. M. Hoghland, field engineer.

Exhibiting (in operation): A new line being shown for the first time of cold-forged socket screws. Our complete line of hardened self-tapping screws and other modern fastening devices.

The functional characteristics of our self-tapping screws will be demonstrated by operating models.

The Partlow Corp.

New Hartford, N. Y.

Booth, Gas Section

In attendance: Howard W. Partlow, Sr., president; Howard W. Partlow, Jr., vice president; and Alvin M. Stock, vice president.

The Penton Publishing Co.

Cleveland.

Booth L-2

In attendance: E. L. Shaner, editor of Steel, president of Penton Publishing Co.; Geo. O. Hays, business manager, Steel, vice president of Penton Publishing Co.; E. C. Kreutzberg, development manager, Steel; R. C. Jaenke, Central Western manager, Steel; S. H. Jasper, Pittsburgh manager, Steel; E. W. Kreutzberg, Eastern manager, Steel; Byron Snell, Eastern representative, Steel; R. H. Smith, Eastern representative, Machine Design; I. H. Such, Eastern representative, Daily Metal Trade; B. K. Price, associate editor, Steel; Erle F. Ross, associate editor, Steel; and R. T. Mason, circulation manager, Steel.

Exhibiting: Magazines: Steel, Machine Design, and Daily Metal Trade, and technical books.

Horace T. Potts Co.

Philadelphia.

Booth G-72

In attendance: Guy P. Bible, sales manager, M. E. Neeley, member of firm; A. L. Collins, assistant sales manager; Arthur Wells, sales engineer; F. A. Guba, sales engineer (stainless); C. M. Rusk, sales engineer (welding); S. L. Bateman, C. R. Spencer, T. I. Potts, N. B. Haas, R. A. Neeley, W. C. Spencer, C. L. Rutter, E. R. Potts, A. W. Ainsworth, manager tool and alloy division; L. D. Willis, salesman; W. H. Dunlap, salesman; D. C. Taylor, salesman; W. B. Jackson, salesman; and H. T. Potts, salesman.

Exhibiting (in operation): Parts made from Horace T. Potts' steels with particular emphasis on stainless, Carpenter matched tool steels and Elastuf steels.

There will be a tool steel selector in operation indicating the method of determining the various types of tool steels.

Product Engineering.

New York.

Booth G-1

Exhibiting: See "American Machinist."

Production Machine Co.

Greenfield, Mass.

Booth F-80

In attendance: W. S. Howe, president; A. H. Behnke, vice president; and T. A. Welch, superintendent.

Exhibiting (in operation): Production type No. 101 patent centerless belt sanding, polishing, finishing and buffing machine for tubes, rod and bar work.

Type "S" production centerless polishing and finishing machine.

Peerless type No. 1—9 in. horizontal production surfacing machine.

Production type No. 2—14 in. horizontal peerless surfacing machine.

Production type No. 601—4 in. bench handy speed finisher.

Production type No. 606—6 in. peerless surfacer.

Production type "R" multi-purpose utility machine.

Products Finishing

Cincinnati.

Booth H-69

Exhibiting: See "Modern Machine Shop."

The Pyle-National Co.

Chicago.

Booth H-44

In attendance: J. A. Amos, vice president and sales manager; C. P. McGinnis, representative; M. M. Connell, representative; R. S. Pollard, representative; F. M. Currie, special representative; and W. A. Wulle, manager, conduit fittings division.

Exhibiting: Turbo-generators, headlights, floodlights, plugs and receptacles and heavy duty electrical wiring devices.

The Riverside Metal Co.

Riverside (Burlington County), N. J.

Booth F-10

In attendance: H. L. Randall, president; J. F. Hackett, vice president and general manager; R. J. Wheeler, metallurgist; H. S. Freynik, metallurgist; J. C. Blake, sales department; and J. V. Hackett, production department.

Exhibiting: Beryllium copper in the form of sheet, strip, bars, and blanks together with a wide variety of applications. Up-to-date information on this heat-hardenable alloy will be available in printed form and attendants will be qualified to answer questions concerning this metal.

Phosphor bronze and nickel silver products and full information will also be available on these alloys.

The Stanley P. Rockwell Co.

Hartford, Conn.

Booth H-71

In attendance: Stanley P. Rockwell, vice president and general manager; William A. Stumpf, sales manager; Dudley W. Rockwell, sales department; and Kenneth Stumpf, in charge commercial heat treating department.

Exhibiting (in operation): "Rockwell" Thermal analyzers for temperature ranges of 2400° F. down to that obtainable by solid carbon dioxide. Also "Rockwell" quenching agitators; "Rockwell" hardening tongs.

Roxalin Flexible Lacquer Co.

Elizabeth, N. J.

Booth A-86

Exhibiting Trail Blazer Trailer and examples of Industrial Finishes.

Rustless Iron & Steel Corp.

Baltimore.

Booth A-22

In attendance: W. B. Pierce, sales manager; Stanley P. Watkins, manager, sales development; R. W. Dietrich, sales engineer; and S. E. Tuttle, sales engineer.

Exhibiting: Stainless steel bars and wire and products manufactured from these alloys.

The Sentry Co.

Foxboro, Mass.

Booth F-1

In attendance: A. A. Harvey, sales manager; and P. B. Crocker, treasurer.

Exhibiting (in operation): The new model "Y" electric high speed steel hardening furnace, which by eliminating water cooling and complicated atmospheric control systems offers economy and efficiency giving

uniform, controlled hardening temperatures and heats to 2350° F. in less than an hour. Constant, correct furnace atmosphere is maintained by the Sentry diamond block method of atmospheric control, assuring tools of maximum hardness and toughness free from scale, decarburization, or reduction in size on molybdenum, tungsten, and cobalt high speed steels. Even the sharpest cutting edges and corners are retained during hardening. Many sizes of Sentry diamond blocks will be on display.

Also showing the single and double tube Sentry high temperature (2550° F.) furnaces offering greater speed and precision for combustion analysis of stainless and other steels. The furnace and terminals are of rugged construction giving an average of more than five years' service. Highly efficient and economical to operate.

Sleeper & Hartley, Inc.

Worcester, Mass.

Booth H-17

In attendance: William H. Blount, treasurer; Raymond F. Russell, general manager; Clayton Fisher, chief draftsman; Edward E. Franks, Jr., draftsman; and Alexander P. Lamitie, assembler.

Exhibiting (in operation): An improved selective type spring coiler known as the three-in-one machine. This machine combines the accuracy of the segment type coiler, with the range of wire feed of the clutch type coiler and can also be used as a continuous coiler. It is driven by a variable speed drive with fully enclosed motor or with single pulley drive. Selective gearing, anti-friction bearings, hardened gears and shafts and multiple disk clutches make this machine more productive, easier to operate, more versatile, and more durable.

A No. 1 Series 610 will be in operation.

Spencer Turbine Co.

Hartford, Conn.

Booth B-71

In attendance: F. A. Wright, special representative; R. B. Richardson, district representative; Frank Martin, district representative; and R. A. Brackett, sales manager.

Exhibiting (in operation): Centrifugal type Turbo compressors used for operating gas and oil-fired furnaces and industrial type vacuum cleaning. A slow speed multi-stage centrifugal type Turbo compressor supplying air for the gas furnaces operating during the exhibit. Also machine made up with special metal for use in handling corrosive acid fumes. The industrial type vacuum cleaner operating to show the effectiveness of cleaning in industrial plants, and handling large accumulations of litter.

Steel.

Cleveland.

Booth L-2

Exhibiting: See Penton Publishing Co.

Steel Publications, Inc.

Pittsburgh.

Booth A-70

In attendance: Don N. Watkins, president; N. R. Moll, sales manager; H. Milton Reich, Western manager; T. B. Little, Eastern manager; Charles Longenecker, managing editor, "Blast Furnace and Steel Plant"; W. C. Kernahan, editor, "Heat Treating and Forging"; and F. B. Yeager, representative, Steel Publications, Inc.

Exhibiting: The publications "Blast Furnace and Steel Plant," and "Heat Treating and Forging".

Stoody Co.

Whittier, Calif.

Booth H-88

In attendance: J. R. Spence, metallurgist; W. M. Grant, secretary; and G. F. Staley, advertising department.

Exhibiting (in operation): A natural color motion picture film equipped with sound.

D. A. Stuart Oil Co., Ltd.

Chicago.

Booth B-48

In attendance: T. B. Langdon, vice president; W. M. Duncan, engineering department; W. H. Huelster, Western sales manager; J. Y. Umbarger, Philadelphia representative; A. J. McDuff, New England representative; T. C. Bradford, Southern Connecticut and New York City representative; and C. J. Nagel, New York state representative.

Exhibiting: Intricate machined parts cut or drawn with Stuart metal working oils. Printed matter illustrating and describing lubrication problems of the day will be available to those seeking information, as well as complete information on the subject of hypoid gear lubricant and extreme pressure (EP gear and bearing lubricants for industrial and automotive applications).

C. J. Tagliabue Mfg. Co.

Brooklyn.

Booth B-41

In attendance: A. F. Rucks, general manager; C. O. Fairchild, director of research; W. C. Bennett, general sales manager; and L. Belluce, L. M. Hachenberg, W. Roberts, sales engineers; also L. Van Blerkom, pyrometer sales.

Exhibiting (in operation): Indicating, recording and controlling instruments for temperature, pressure, level, and flow. Also the latest Tag instrument developments.

A radically new Tag celectray recorder with a sensitive mirror galvanometer as the primary controlling element will be featured. In this design an inertialess beam of light takes the place of the customary metal boom or pointer. The beam of light from the galvanometer in moving on and off a phototube passes "the controlling edge" of a screen, thus operating relays which in turn control a reversing motor which drives the moving contact of the wheatstone bridge or potentiometer. This new instrument is noteworthy for its extreme simplicity, accuracy and speed, particularly in multiple point recorders.

Tag photoelectrically balanced potentiometer pyrometer and other new types of control instruments will be shown for the first time.

A complete line of pressure spring instruments of advanced mechanical construction in the new rectangular cases.

Tag magnetic clutch flow instruments, Tag industrial thermometers, Tag chemical ther-

Enduring Beauty

優美耐久

Beauty that lasts under severe service conditions —this you can obtain by finishing your product with **DURAD ENAMELS.**

These enamels are beautiful when first applied and they maintain their beauty. They are resistant to marring, moisture, household chemicals, fruit juices, grease, alcohol and other destructive agencies.

They were specially developed for high-grade products subject to hard service, such as automatic heaters, air-conditioning units, refrigerators, water coolers. Supplied in all colors for high, medium, and low temperature baking, and for air-drying.

Maas and Waldstein Co. Newark, N. J.

Branch Offices and Warehouses . . . 1336 Washington Blvd., Chicago . . . 1228 W. Pico Blvd., Los Angeles

Established 1876 — Producers of Lacquers and other Industrial Finishing Materials

Manufacturer Increases Sales Force By Using Durad Enamels

A manufacturer recently adopted M&W Durad Enamels for finishing a high-grade metal product used in homes, because, he said, "The use of this finish multiplies the number of good salesmen working for me."

"A good finish is one of the best of salesmen," he explained. "It works for you in the show room, and it continues to work for you after the product is bought and is placed in service.

"As soon as a finish becomes marred and disfigured, its usefulness is over. By using a finish that stands up for a long period of time, I increase the number of customers that come to my dealers because they have seen my products in the homes of friends."—Adv.

mometers, Tag hydrometers and oil testing instruments will be prominently featured.

The Timken Roller Bearing Co., Steel & Tube Division.

Canton, Ohio.

Booth E-48

In attendance: H. H. Timken, Jr., vice president; S. D. Williams, director of sales; W. E. Taggart, assistant manager of tube sales; Ralph Wilson, metallurgist; L. L. Ferrall, metallurgist; Martin Fleischmann, metallurgist; J. E. Fick, general superintendent; E. S. Hoopes, assistant general superintendent; F. R. Bonte, sales department; A. R. Adelberg, sales department; and W. P. White, district manager, Philadelphia.

Exhibiting: Numerous products made from Timken steel and parts made from Timken graphitic steel.

The Titanium Alloy Mfg. Co.

Niagara Falls, N. Y.

Booth F-76

In attendance: G. F. Comstock, metallurgist; W. G. Wellings, chief development engineer; E. R. Starkweather, development engineer for cast iron; S. T. Harleman, development engineer; J. B. Bates, Titanite Alloys Corporation; D. A. Thompson, sales and development; E. L. Lasier, vice president; K. B. Thews, chief development engineer for refractories; and E. T. Goodridge, assistant to the president.

Exhibiting: Samples of Titanium alloys and Zircon refractories. Photographs and actual castings showing the structure of Titanium treated steel, cast iron, and aluminum.

The Torrington Manufacturing Co.

Torrington, Conn.

Booth H-9

In attendance: Henry G. Ellis, president; Alexis Doster, vice president and secretary; Henry Nigro, Arthur Nigro, C. R. Bergevin, and Eric Lejeski.

Exhibiting (in operation): A new line of spring making equipment complete with spring coiling and winding machinery. Engineers experienced in the design of spring making equipment have developed in these machines high speed production, with the result that the spring machinery announced at the exposition possesses decidedly novel features as contrasted with earlier designs. Backed by its wide experience in this field, the company has now entered into the field of spring manufacture with a complete line of spring coiling and winding machinery. A few of the features of the new designs are: Simple feed adjustment, safety hand wheel, fully enclosed compact design and built-in motor; ample wire and coil capacities in each machine; Timken roller bearing equipped; convenient, accessible controls for pitch, diameter, cut-off, etc.; square clean cut ends; production speed variable either by change gears or standard variable speed unit; wire feed on clutch type adjustable through fixed center change gears or sliding gear box. The line includes segment and clutch type coilers in 8 sizes, covering a range from .006 inch to $\frac{3}{8}$ inch diameter wire and torsion spring machines in 4 sizes, covering a range from .006 inch to $\frac{1}{4}$ inch diameter wire.

Unitcast Corp.

Toledo, Ohio.

Booth C-91

In attendance: R. F. Tillman, president; J. L. Tillman, vice president; L. C. Merb sales manager; Floyd Brown, inspectio engineer; V. E. Zang, metallurgical eng neer; H. H. Serrels, metallurgist; and E. H Fisher, advertising manager.

Exhibiting: Alloy steel castings of variou types, both in rough and finished condition

Wheelco Instruments Co.

Chicago.

Booth B-84

In attendance: Leo Wheeler, president; Richard Schoenfeld, sales manager; George Wheeler, secretary and treasurer; Ted A. Cohen, chief engineer; George Keller, sales representative; Wm. Printz, sales representative; and Clarke Joy, sales representative.

Exhibiting (in operation): The following equipment will be operating on special panel boards designed to best show the operating features and construction: Capacitrol; Limitrol; Proportioning Control; and Flame-otrol. Also a complete line of Wheelco pyrometers, both wall and portable type as well as other small items manufactured by this company.

The new Wheelco portioning controller will be introduced for the first time at the Atlantic City show.

Wiedemann Machine Co.

Philadelphia.

Booth A-46

In attendance: Ernest J. Rollings, superintendent; Theo. A. Wiedemann, sales manager; and Chas. R. Gessler.

Exhibiting (in operation): A 12-inch throat turret punch with 12 punches and dies up to 1 inch diameter mounted in a revolving turret.

A turret punch for 24 inch wide sheets with 12 different sizes of punches always instantly available.

A type R-4 twelve station deep throat turret punch in three standard throat depths of 18, 24, and 28 inches.

Type R-2 twelve inch throat turret punch. Capacity of 15,000-80,000 pounds pressure.

Type 6-B turret punch, $2\frac{3}{4}$ inch depth of throat. Capacity of $\frac{1}{2}$ inch diameter hole in $\frac{3}{16}$ inch thick machine steel.

Type R-4P motor driven deep throat turret punch in 18, 24, and 28 inch standard throat depths.

Type R-5 heavy duty motor driven turret punch with 18 inch throat with 12 station turret or type R-6 in 30 inch throat with 15 station turret.

Wilson Mechanical Instrument Co., Inc.

New York.

Booth C-50

In attendance: V. E. Lysaght, sales manager; D. F. Sklar, development engineer; A. C. Wilkins, New York representative; R. B. Coleman, Philadelphia representative; and J. P. Roberts, Buffalo, Cleveland, Pittsburgh representative.

Exhibiting (in operation): "Rockwell" hardness tester; "Rockwell" superficial hardness tester for thin material and superficially hardened surfaces; adapters for hardness testing the inner cylindrical surfaces of rings and cylinders; and latest work support accessories for the "Rockwell" tester.

Carl Zeiss, Inc.
New York.
Booth G-80
In attendance: V. M. E. Koch, vice president; S. Meyer, vice president; E. Sobotka, salesman; and W. G. Kramer, salesman.
Exhibiting (in operation): Metallograph Neophot for bright field, dark field, and polarized light observation of metal specimens at all suitable magnifications.
Spectrograph "Qu-24" for the quantitative and qualitative analysis of metals in the industrial laboratories. The instrument is well adapted for this purpose because it requires no particular experience, skill or complicated adjustments.
Spectrum line photometer for evaluating spectograms in quantitative analysis.
Spectrum projector for evaluating spectograms in qualitative analysis.
Feussner sparking apparatus, patented, keeps at a constant the energy emanating from a source of light. This is necessary in order to arrive at a truly quantitative analysis.

"Hamilton Portable Elevating Table." This is the title of an 8 page folder which is now being issued by The Hamilton Tool Company, 222 North B St., Hamilton, Ohio. The Portable Elevating Table is said to relieve the drudgery of handling heavy work and materials. The sturdy, safe construction, and easy positive operation have won the acceptance and approval of safety engineers, efficiency men, foremen and mechanics wherever the Hamilton Portable Elevating Tables have been tried. A copy of this folder free upon request.

Tarnish-proof Lacquer No. 4527 and Outdoor Lacquer No. 4917. A product summary giving the properties of Tarnish-proof Lacquer No. 4527 is now being issued by the Roxalin Flexible Lacquer Co., Inc., Box 775, Elizabeth, N. J. This lacquer provides a high mar-resistant finish for brass and silver. It is a clear, cellulose type, air-drying flexible lacquer with high resistance to tarnish. It is available for spraying and dipping.

A product summary giving the properties of Outdoor Lacquer No. 4917 is also now available. This lacquer is a clear, cellulose type, air-drying flexible lacquer for use where resistance to wind and weathering is desirable. The lacquer is said to have unusual adhesion, and also high resistance to "spotting out." Copies free upon request.

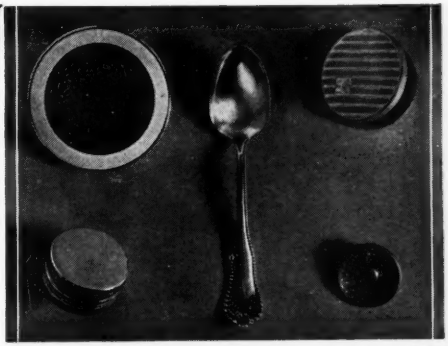
PURICO
WONDERBAR
(TRADE MARK)
Pat. No. 2078876

Here's a pre-saponified buffing and polishing composition — **SOLUBLE IN WATER.**

Cleaning after Buffing consists in removing grease particles left by the Buffing compound. Since these particles in Purico Wonderbar are soluble in water, no brushing or scrubbing is necessary — depressions and holes are cleaned out simply and speedily.

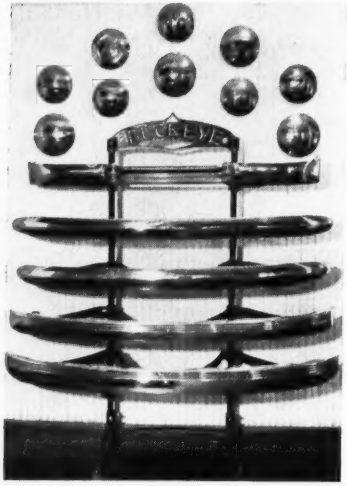
Purico Wonderbar is ideal for buffing and polishing work with grooves, recesses, filigree, etc.

WRITE FOR CIRCULAR.



- Cleans easier and faster.
- Does not tarnish the work.
- Saves washing.
- No brushing or scrubbing.
- Saves by reducing rejections.
- Saves by reducing labor costs.

THE PURITAN MFG. CO., Waterbury, Conn.



Examples of the fine workmanship in both fabrication and finishing of Buckeye bumpers and hub caps.

Plating Bumpers and Hub Caps at Buckeye Bumpers

This is the story of a modern plating department, the features of which are automatic equipment and straight line production plating.

By Fred W. Vogel

AN excellent example of plating and polishing on a production basis by the use of automatic and semi-automatic equipment is found in the plant of Buckeye Bumpers, a division of The Electric Auto-Lite Company, at Springfield, Ohio. This plant makes bumpers and hub caps for a number of well-known American makes of automobiles and under the able direction of Mr. B. F. Fortier, vice-president and general manager, has been brought to a state of comparatively high efficiency. Here is to be found one of the few installations of fully automatic plating machines of such a size that will handle automobile bumpers, and here also is to be found an excellent example of straight line production in the plating of hub caps.

This plant has its own forge and stamping shop in which both the bumpers and hub caps are produced, but we will begin with the pickling of the bumpers after they have left the forge shop as a preparatory operation to finishing.

After fabrication, the first in the series of finishing operations on the bumpers is removing the scale by pickling. In Fig. 1 an operator can be seen loading the conveyor of the automatic pickling tank. The pickling unit occupies a space 90 ft. long and approximately 8 ft. wide. Ventilating hoods are provided over the entire unit so as to prevent fumes from escaping into the room.

Following the pickling operation, the bumper bars are transferred from the pickling unit conveyor to an overhead conveyor which carries them to the polishing department. The equipment in this department includes two automatic machines: the Divine Brothers automatic polishing machine shown in Fig. 2 and an automatic machine of older design, illustrated in Fig. 3. The Divine Brothers machine is a twelve-wheel unit in which a dual chain conveyor is employed to

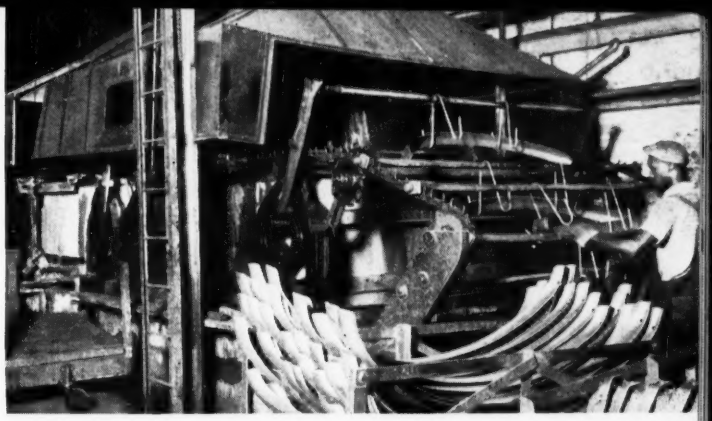


Fig. 1—View of one end of the 90 ft. fully automatic pickling tank. Each bumper bar is placed individually on the hooks which hang from the bars of the automatic conveyor.

carry the bumpers through the polishing sequence. The bumpers are loaded individually on cross-bar holding fixtures arranged at intervals along the conveyor and pass beneath each one of the 12 polishing wheels in turn before emerging at the far end of the unit.

The conveyor used on the machine shown in Fig. 3 employs individual fixtures or "buggies", one of which can be seen in the foreground of the illustration. A projection on the base of each buggy is arranged so that it will engage one of the dogs which are located at intervals in the chain. The chain operates between a pair of rails which form the track upon which the buggy rides. As the buggy is pulled along by means of the conveyor, the bumper passes beneath the row of polishing wheels, pressure being applied to the bumper by the combination of gravity and a counterweighted motor. To assist in obtaining the maximum production from these machines, the wheels are set up with Grainlock Cement, which has the quality of hardening, rather than softening, under heat.

A great amount of heat is generated as the bumpers pass beneath the polishing wheels, consequently after the bumpers pass beneath 12 wheels a water quench is provided to cool the bumper. The bumper then passes beneath the following 12 wheels. The first 24 wheels are provided for coarse polishing, the second 24 wheels being provided for fine polishing.

Since no automatic unit has been conceived as yet which will effectively polish the rounded ends of the bumpers, these ends must be polished by hand. The department in which the bumper ends are polished is shown in Fig. 4. The machines on which the work is being polished are double

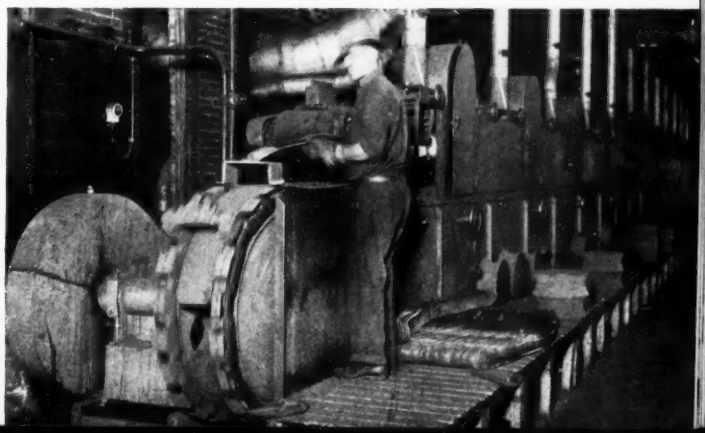


Fig. 2—The bumpers are placed on small four-roller buggies and drawn beneath a series of polishing wheels by means of a conveyor chain.

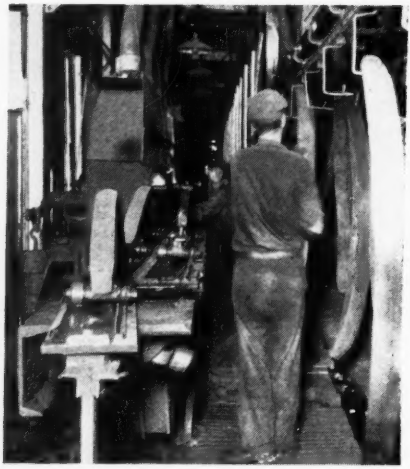


Fig. 3—Automatic bumper polishing machine. This is a twelve-wheel unit which was designed by Divine Brothers.

spindle U. S. Electrical Tool polishing machines. There are 16 men working in this department, each man operating an individual machine. On one of the spindles of each of the machines is a coarse polishing wheel and on the other spindle is a fine polishing wheel. After the ends are polished, the bumpers are ready to be transferred to the cleaning department, prior to plating.

Before plating, the polishing compound which has accumulated on each bumper must be removed, for which a Crescent washing machine is provided. A workman can be seen in Fig. 5 placing bumpers on the automatic conveyor of this machine. The time required for this cleaning operation is approximately 10 minutes, the first part consisting of a spray washing and the second part thorough rinsing. After the bumpers are thoroughly dried, they are placed in groups of three on the conveyor bars of the full automatic nickel unit. The plating cycle of this automatic nickel unit is the same as is used in semi-automatic and hand units. A view of the full automatic nickel setup is shown in Fig. 6. Here a workman can be seen removing the nickel plated bumpers and placing them on an overhead conveyor.

From the nickel plating tanks the bars are conveyed to the nickel buffing department, a view of which is shown in Fig. 7. The same method of holding the bumper employed in the polishing of the bumper is also used in nickel buffing. Two pairs of tracks are provided for the buggies on which the bumpers are placed, one set of

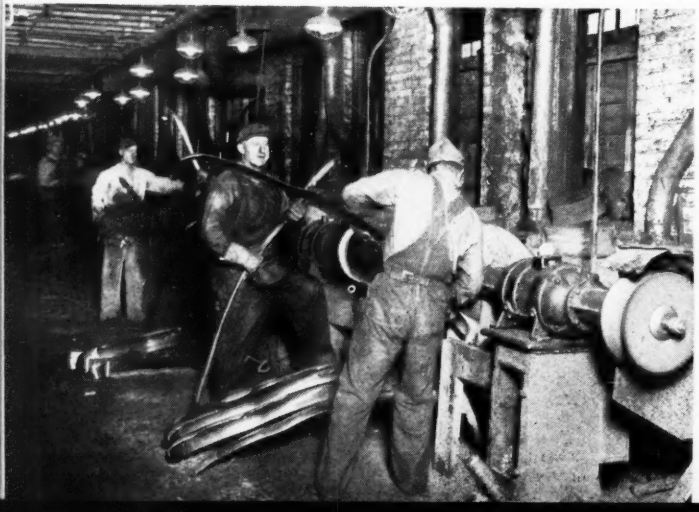


Fig. 4—This is a view of the department where a battery of 16 hand polishing machines are provided for the purpose of hand polishing the curved ends of each bumper.

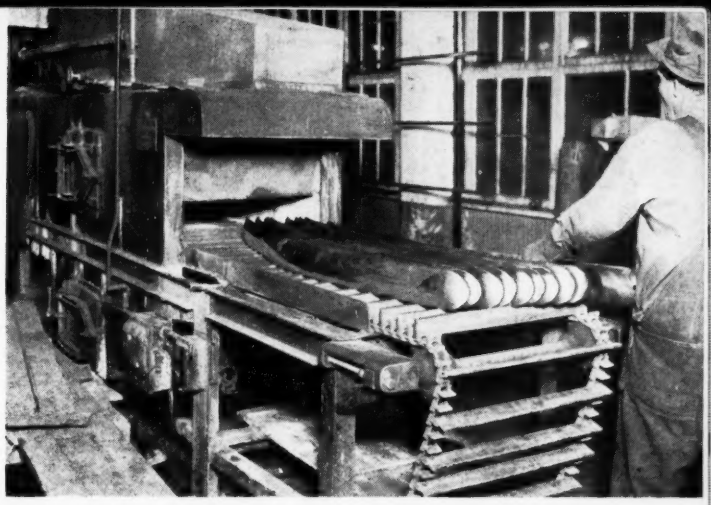


Fig. 5 — Washing the bumpers prior to electroplating. Thorough washing and drying is effected in 10 minutes by the use of this machine.

tracks running directly beneath the polishing wheels, the other pair being located beside the first pair. Since the bumpers pass in one direction only beneath the polishing wheels, the second set of tracks is used to return the buggies to the starting end. A short section swivel track is provided at each end so as to provide a means for transferring the buggy from the buffing track to the side return track. After nickel buffing, the bumpers are again hung on the overhead conveyor and transferred to the chromium plating department.

At this point, the bumpers are placed on the chromium plating tank conveyor in groups of 10. A view of the chromium plating department is shown in Fig. 8. The sequence of chromium plating starts with a 45 second to one minute electrocleaning. A cold water rinse and acid dip follow. Directly before the bumpers are placed in the chromium plating tank they are given another cold water rinse. The plating time required for the bumpers varies from 2½ to 3½ minutes. A cold water rinse and hot water rinse follow.

The chromium plating operation practically completes the finishing cycle with the exception of a coating of aluminum lacquer which is sprayed onto the inner surface of the bumper by the operator shown in the illustration Fig. 9. This is a quick, air-type drying lacquer, consequently by

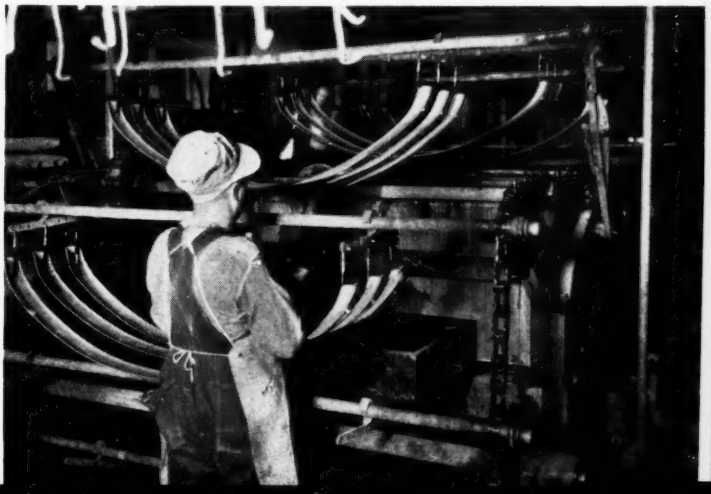
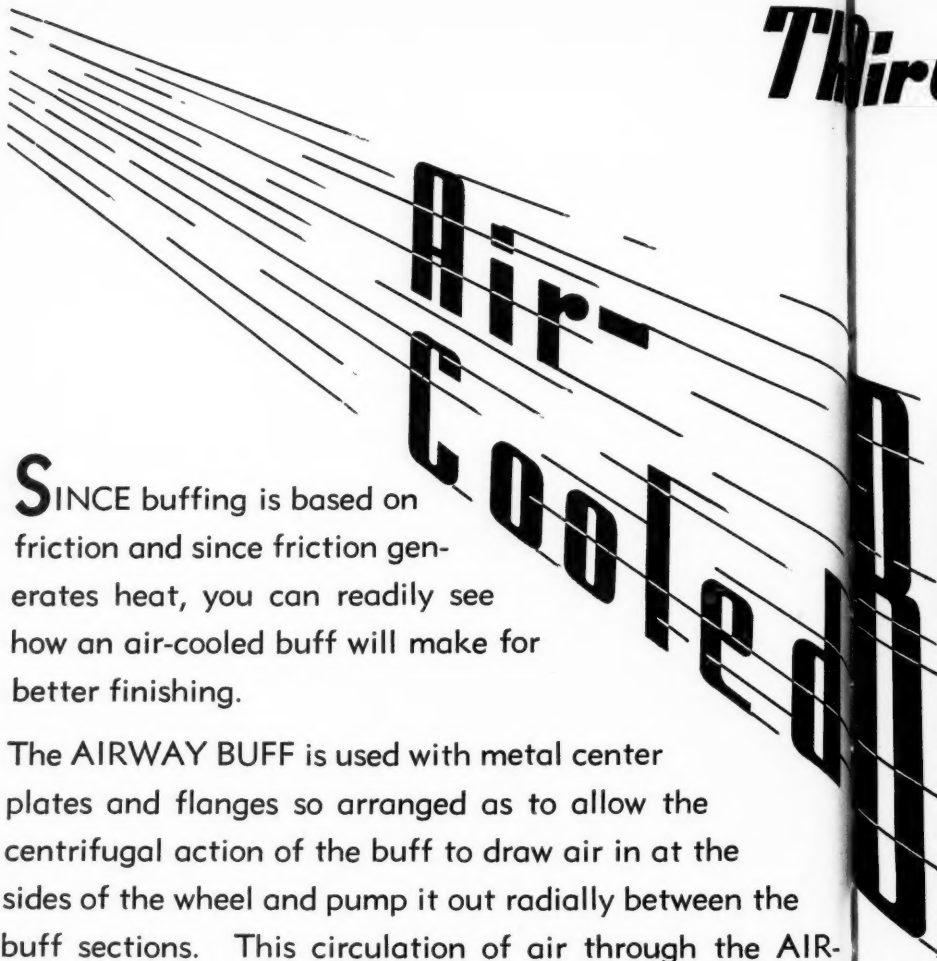


Fig. 6—The workman is unloading nickel plated bumper bars which have been plated in groups of three.

October,



SINCE buffing is based on friction and since friction generates heat, you can readily see how an air-cooled buff will make for better finishing.

The AIRWAY BUFF is used with metal center plates and flanges so arranged as to allow the centrifugal action of the buff to draw air in at the sides of the wheel and pump it out radially between the buff sections. This circulation of air through the AIR-WAY keeps it cool under most severe operating conditions, entirely eliminates burning and thus prolongs the life of the buff.

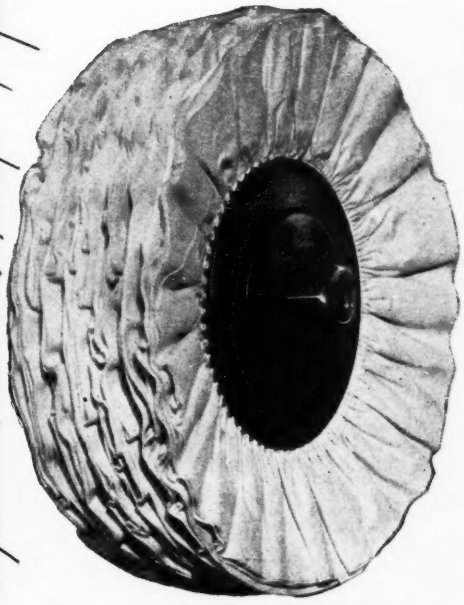
JACKSON BUFF CORPORATION
21-03 41ST. AVENUE • LONG ISLAND CITY, N. Y.

"Airway Ventilated Buff

5 Features "Airway" Cooling

1. permits 50% to 100% higher speeds.
2. faster cutting and does not ridge the work.
3. eliminates burning and prolongs the life of the buff.
4. raveling eliminated.
5. saves compound.

BUFF



Airway Buff Requires No Raking

finishing department, the production schedule calls for 1,000 hub caps per hour. To meet this requirement, all of the necessary equipment has been carefully located so as to reduce time loss between operations to a minimum. Straight line production has helped to solve this problem and has also helped to place the plating department of this plant among the foremost finishing departments in the

Fig. 7 (Left)—The same type of bumper bar holding fixture is used in the nickel buffing department as in the polishing department. The bumper bars are very carefully buffed before chromium plating.

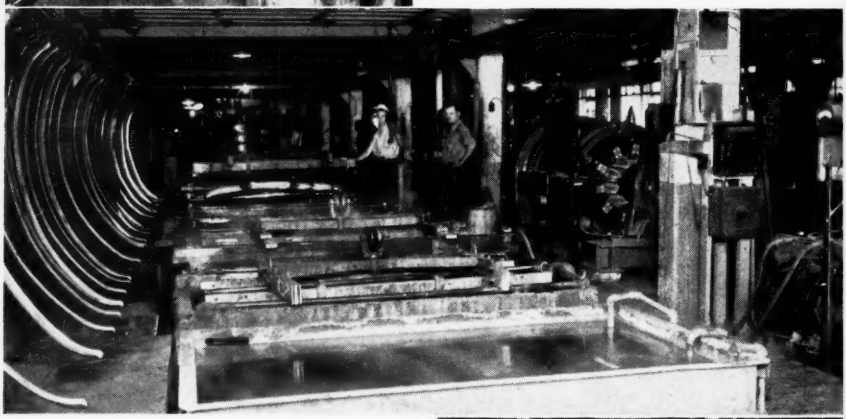
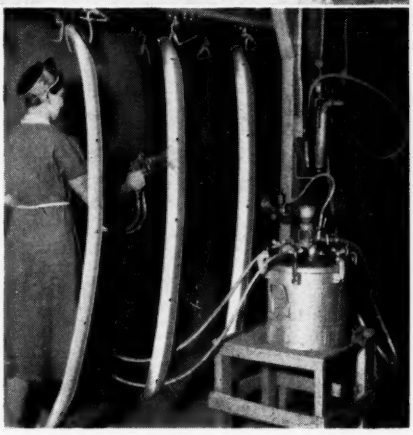


Fig. 8 (Above)—Chromium plating department. Racks of 10 bumpers each are conveyed from one tank to the next by means of an overhead conveyor.

Fig. 9 (Right)—A coating of aluminum lacquer is applied to the backs of the bumper bars.



the time the bumper reaches the end of the conveyor line, it is perfectly dry and ready for packing. The three bumpers shown being sprayed with aluminum lacquer in Fig. 9 are the first three bumpers off the production line which are now in the process of manufacture for the 1938 model of a well-known automobile.

In the hub cap fabrication and

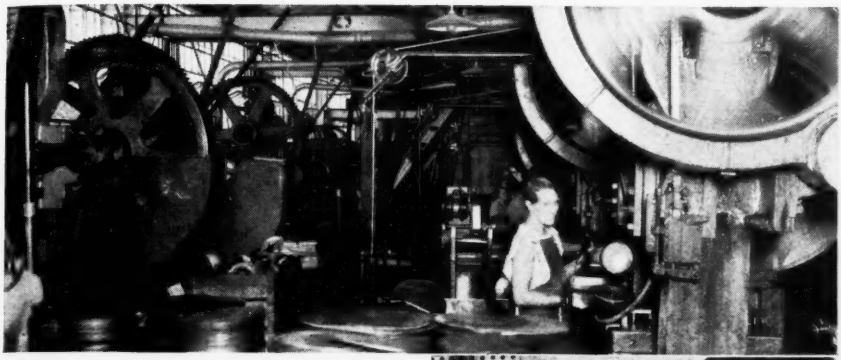
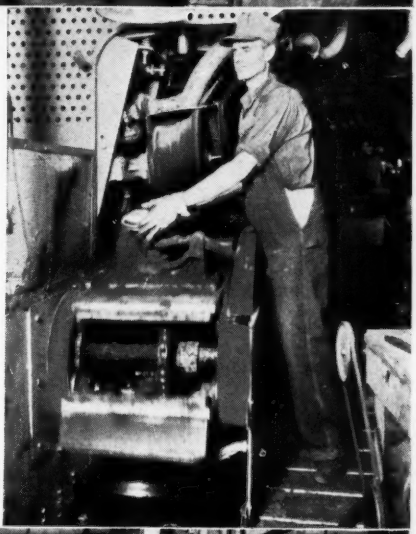


Fig. 10 (Above)—The steel shells are formed expanded, spun, curled, and embossed in the presses shown in this illustration. The operator at the right is holding a shell which has passed through the first forming operation.

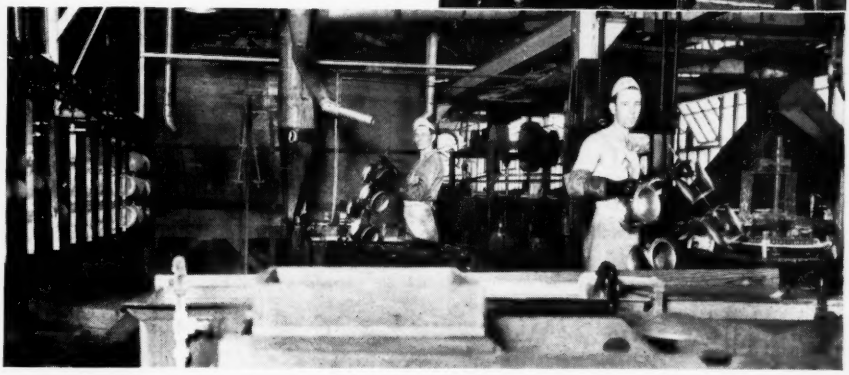
Fig. 11 (Below)—Department in which the steel shells are zinc plated.

Fig. 12 (Right)—The brass outer shells are buffed on this six-wheel fully automatic buffing machine before being transferred to the nickel plating department.



United States.

The ordinary automobile hub cap consists primarily of two separate shells, namely, an inner shell of steel, and an outer shell of brass. The first forming operation on the steel shell is performed in the stamping department, a section of which is shown in Fig. 10. Following forming, the steel shell is expanded, spun,



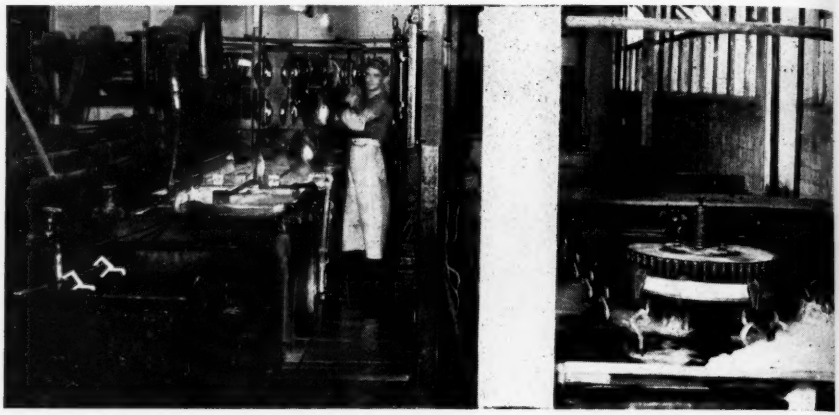


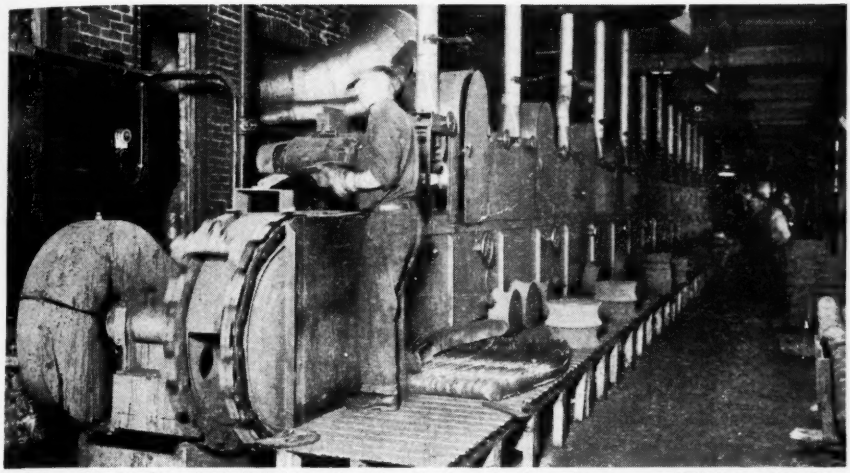
Fig. 13—Nickel plating department. The brass shells are first electrocleaned and then nickel plated.

curled, and embossed.

The shell is then placed on a belt conveyor which transfers it directly to a hopper in the zinc plating department. A general view of the equipment which comprises this department is shown in Fig. 11. An electrocleaning, hot water rinse, acid dip, and a cold water rinse tank are located in the center background. The semi-automatic zinc plating unit can be seen at the right and three cold water rinse tanks in the foreground.

When the shells reach the hopper in the zinc plating department they are racked in groups of four, and placed in the electrocleaning solution for a period of 1½ minutes. The hot water rinse, acid dip, and cold water rinse follow. The shells are then ready for zinc plating. The conveyor of the semi-automatic zinc plating tank is provided with 47 hooks, consequently the maximum number of shells that can be plated at one time is 188. The time required for the conveyor to make one complete revolution is 8 minutes, which is the amount of time required to obtain

Fig. 14—The operator in the illustration is rinsing the nickel plated shells and examining them very carefully before transferring them to the conveyor belt which takes them into the chromium plating department.



Automatic Twelve-wheel Polishing Machine Used at Buckeye Bumpers. Polishing Wheels set up with Grainlock Cement.

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MAXIMUM PRODUCTION

the wheels are set up with

GRAINLOCK"

(See article page 31 this issue)

Studied economy and efficiency in every production detail built the success of Buckeye Bumpers, Springfield, Ohio—regular users of GRAINLOCK CEMENT for high-production polishing equipment.

In this fact there is a business moral for all polishing plant managers who have not yet learned these truths:

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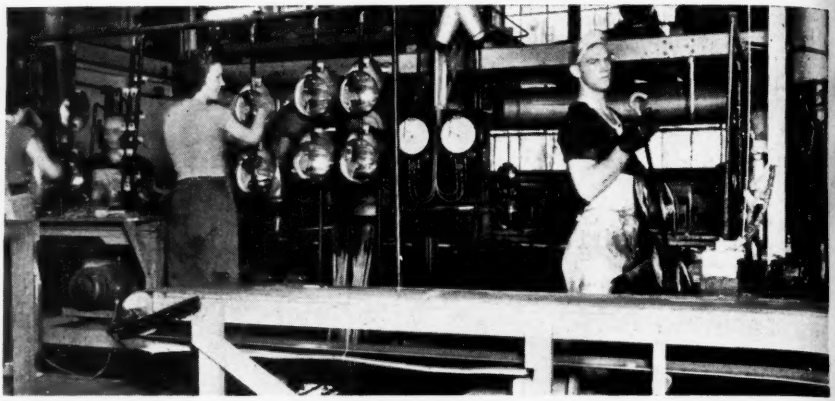

Fig. 15—Chromium plating department. The nickel plated shells are given a 0.00003 inch chromium plate.

a thickness of zinc which will resist 20 drops of acid. The zinc plating unit is provided with a hood which covers the entire unit with the exception of a small area at one end whereby the work can be loaded and unloaded. The hood is portable, however, so that it can be easily removed to permit checking of the anodes which completely line the inside of the tank. After the shells have been zinc plated, they are thoroughly rinsed in three separate cold water rinse tanks and placed on an overhead conveyor and transferred to forming presses at the far end of the department. Zinc plating completes the finishing operations on the steel inner shells.

Buffing is the first finishing operation that is performed on the brass outer shells of the hub cap. To facilitate this operation, a Riordan, six wheel, fully automatic buffing machine is provided. Fig. 12 shows a workman removing a shell that has been buffed on the automatic unit. The fixtures on which the shells are placed revolve as they pass beneath the series of six buffing wheels, thus a

Fig. 16 — Inspecting the chromium plated outer shells. Any surface defects are noticeable under the bright, diffused light of the inspection lamp.

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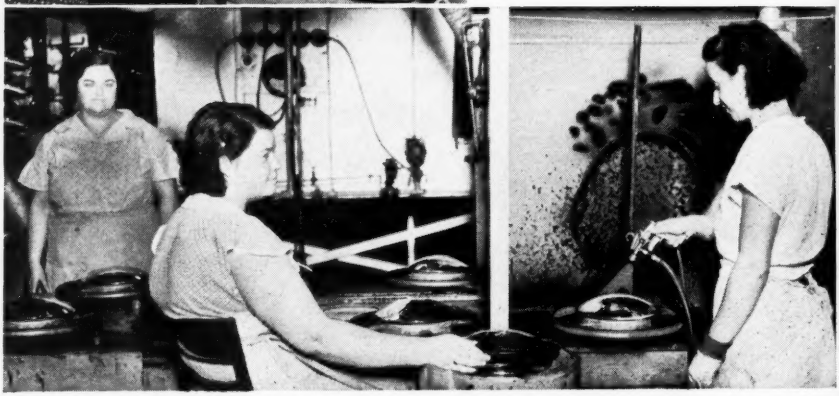

thorough buffing is insured. From the buffing machine shown in Fig 12, the brass shells are transferred to the nickel plating department by means of a belt conveyor. Each shell is carefully checked at this point for surface imperfections that would prevent securing a smooth surface plate.

A view of the nickel plating department is shown in Fig. 13. At the left in this illustration two electrocleaning tanks can be seen, one of which is used for cathodic and the other for anodic cleaning. Ordinarily, the work is made the cathode because the volume of gas liber-

Fig. 17 (Top)—An embossing press in which the chromium plated shells are embossed with the name of the particular automobile on which they are to be used.

Fig. 18 (Center)—Assembling the inner and outer shells of the hub caps. The operator places the outer shell in the die and inserts the inner shell into it and the operation of the press seats the inner shell and closes the rim of the outer shell over it to hold it in place.

Fig. 19 (Below)—Enameling the embossed name on the hub cap. A mask comprising practically a stencil in which the name of the automobile on which the cap is to be used has been cut is placed over the cap.

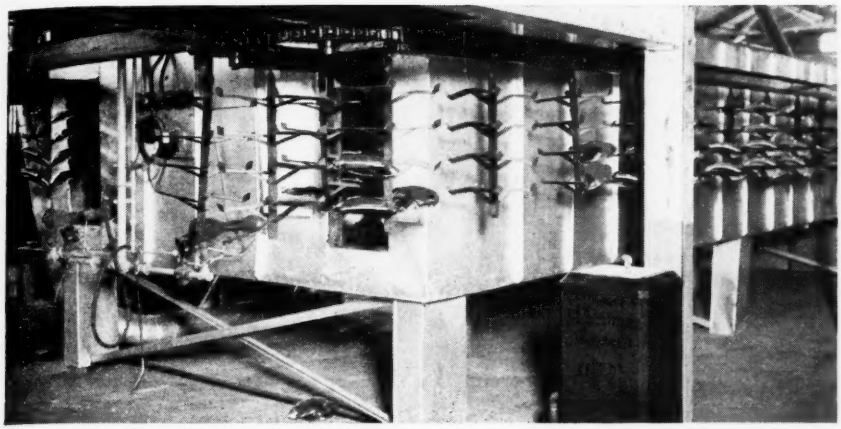

Fig. 20—After the caps are enameled, they pass into the oven shown in this illustration. When the caps emerge from this oven they are ready to be packed and shipped.

ated at the cathode is twice that liberated at the anode, but in the case of the brass shells, zinc or tin goes into solution and deposits back on the work, causing lifting or staining in subsequent plating operations. The inert matter in the solution also plates on the work. The work stains somewhat when it is made the anode, but that objection is offset by the fact that inert matter will not adhere. A multiple effect is obtained by the use of the two tanks. The first tank performs the major cleaning operation and the second tank removes any smut that may have been deposited in the first tank. The time required for the cathodic cleaning is usually 1 minute and that for anodic cleaning, 3 to 5 seconds. After cleaning, the shells are thoroughly rinsed in two separate clear water tanks, one hot and the other cold.

The semi-automatic nickel plating unit in which the brass shells are plated can be seen at the right in Fig. 13. Forty hooks are provided on the conveyor of this unit and the time required for the conveyor to make one complete revolution is 9¼ minutes. This is also the time required for obtaining a deposit of 0.00025 inch of nickel. Following nickel plating, the shells are rinsed and inspected by the operator shown in Fig. 14. If the shells pass inspection, they are placed on the belt conveyor shown at the left in the illustration and transferred to the chromium plating department, a view of which is shown in Fig. 15. Here the shells are again racked and subjected to another cleaning operation. The shells are left in the cleaning tank a specified number of minutes, then they are moved on to the rinse tank, where the cleaning solution is washed off. The next tank is an acid dip for preparing the surface and a rinse follows to remove the acid. The shells are then dipped into the chrome tank and allowed to remain there for 1¼ minutes until a deposit of 0.00003 inch is obtained.

The chromium plate is inspected by the operator shown in Fig. 16. Any surface defects are noticeable under the bright, diffused light of the in-

spection lamp. Plated shells that do not meet with the approval of the inspector are set aside and later reworked, and those which pass inspection are returned to the conveyor belt and pass on to the final operations.

Figure 17 shows an operator at one of the embossing presses. At this point, the chromium plated shells are embossed with the name of the particular automobile on which they are to be used.

The next operation is that of assembling the inner and outer shells of the hub caps, which operation is performed in the press shown in Fig. 18. The operator places the outer shell in the die and inserts the inner shell into it and the operation of the press seats the inner shell and closes the rim of the outer shell over it to hold it in place. After the two shells have been fastened together to form a complete hub cap, they are placed on another conveyor and transferred to the enameling department. A view of the enameling department is shown in Fig. 19. A mask comprising practically a stencil in which the name of the automobile on which the cap is to be used has been cut is placed over the cap. The cap is then placed on one of the 12 fixtures of a local conveyor which carries it into the spray painting booth shown at the right in the illustration, where the cap is sprayed through the stencil. The final transfer operation is to the oven conveyor, which passes into the left side of the baking oven shown in Fig. 20. The time required for the shells to pass through this oven which is closely maintained at a temperature of 325 deg. F. by means of a Brown Indicator is 1½ hours. When the caps emerge from the baking oven, they are ready to be packed and shipped.

Careful and efficient planning on the part of the Buckeye engineers has enabled them to reduce the time interval between each operation to a minimum and thus produce a quality product of the highest standard at the least possible expense.

Protex Folder. In an effort to acquaint the trade with the desirable qualities of Protex, Haydn F. White and Co., 1740 East 12th St., Cleveland, Ohio, is now issuing a 4 page folder describing the uses of this high finish protector. There are seven types of Protex available, each type having been developed for a specific use. No. 1 Standard Protex gives a very resistant film for all around use. No. 2 Fogless Protex is particularly adapted to highly polished surfaces of metals. It is free from chlorides, sulphur, or chemicals which might corrode certain metals. No. 3 Special Resistant Protex can be used where unusual aging conditions are found. No. 4 Enamel Type Protex is for use on varnish, lacquer, or similar type enamels with sensitive pigments. No. 5 Acid Resistant Protex can be used where acid, heat, or light resistance is required. This type may be baked to a temperature of 300 deg. No. 10 Adhesive Protex gives a film which is adhesive, especially suitable to be used in combination with paper, such as wrapping bumpers, and so on. No. 12 Fabricating Protex is especially suitable for special types of drawing and forming operations.

A copy of this folder free upon request.

"Production of Castings for Porcelain Enameling." This is the title of a handbook which is being published by the Porcelain Enamel Institute, 612 N. Michigan Ave., Chicago, Ill.

The booklet, which has been undergoing preparation by the Committee on Cast Iron Practice of the Institute's Technical Research Section for more than a year, is the result of cooperation between expert foundrymen and representatives of the porcelain enameling industry.

Included in the booklet are a number of illustrations showing improper and proper designs of castings. It is divided into easily understood sections, some of which follow: Blistering, Warping, Influence of Design, Influence of Molding Practice, Influence of Melting and Pouring, Influence of Iron Composition and Influence of Raw Materials. Sample copies of the booklet may be obtained from the Porcelain Enamel Institute, 612 N. Michigan Ave., Chicago, Illinois.

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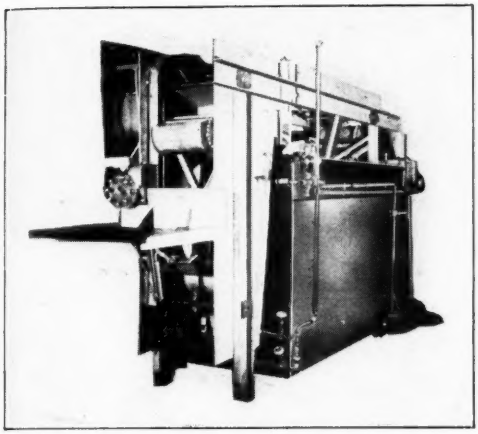

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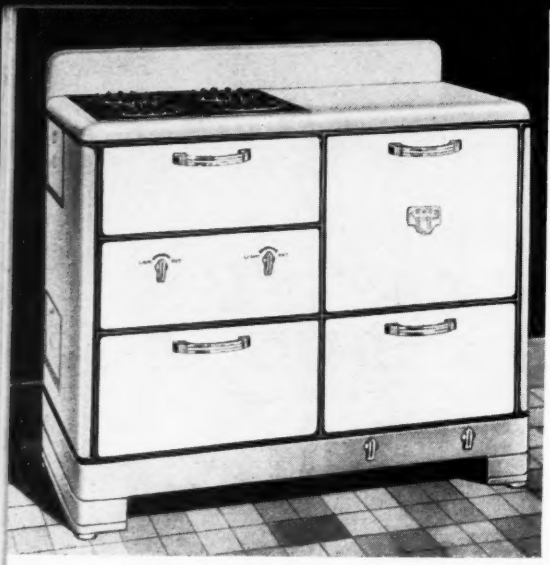

A complete, new installation of modern equipment in the finishing department has enabled this firm to increase production and at the same time retain its high standard of quality finishing.

Modern Equipment Facilitates Enameling Operations at United Stove Company

By Bartlett West

ALONG with the modern flare for color in interior decorations, has come a demand for colorful furnishings. Where formerly the only color considered suitable for kitchen ranges and heating units was black, we now find practically all the colors of the spectrum. The use of a wide range of colors for stove decorations has resulted in increased sales, but has at the same time multiplied production problems. The manner in which these problems have been met by the United Stove Company, Ypsilanti, Michigan, through the use of modern equipment is told in

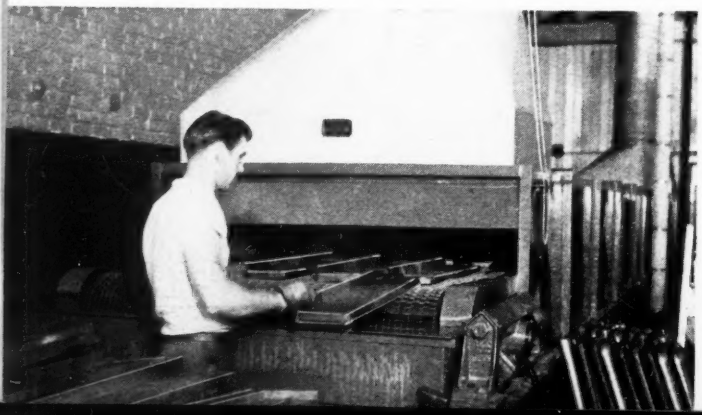

Fig. 1—Loading end of the unit in which the workpieces are placed on a mesh conveyor to be washed, rinsed, and dried off.

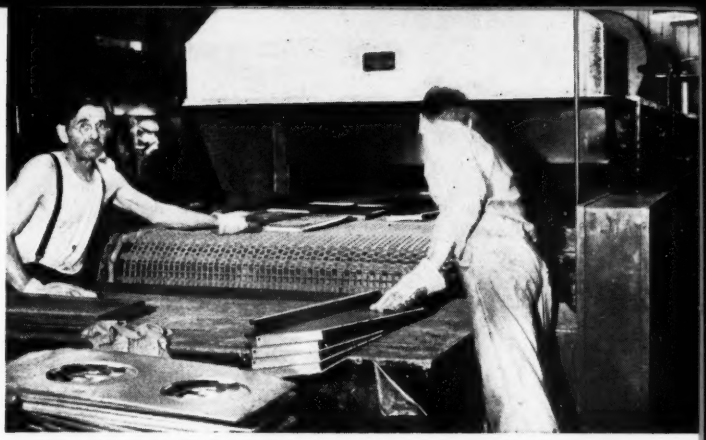

Fig. 2—Unloading end of the mesh conveyor. The panels shown in the illustration are ready to be enamel finished.

this article. Air conditioning, water washed spray booths, and variable speed conveyors of the latest design are but a few of the features of this installation. This installation was planned, designed, and constructed by the R. C. Mahon Company, Detroit, Michigan.

The first in the series of finishing operations on the stove panels is the washing of the panels, which is accomplished by means of a Detroit Rex cleaning unit, an illustration of which is shown in Fig. 1. The entrance opening of this unit is located outside of the finishing department proper and the exit opening is conveniently located within six feet of the spray painting booths, which are located on the inside of the finishing department. The stove panels, consisting mainly of flat surfaces such as ends, fronts, sides, and splash panels, are placed on the mesh belt conveyor of this cleaning unit, which is approximately 75 feet long. The speed of the conveyor is such that the panels are subjected to a spray cleaning solution for approximately nine minutes, after which they pass on through a cold water rinse located in the same unit.

A Cleveland speed reducer driving a Reeves variable speed drive makes it possible to operate the mesh conveyor at any one of an infinite number of speeds. As the panels pass through the unit they are sprayed with a solution of Triad Solvent No. 15 from every angle. The temperature of the cleaning solution is maintained at 175 deg. F. and is checked every two days so that any necessary additions can be made.

Following the cold water rinse, the panels pass through a hot air cham-

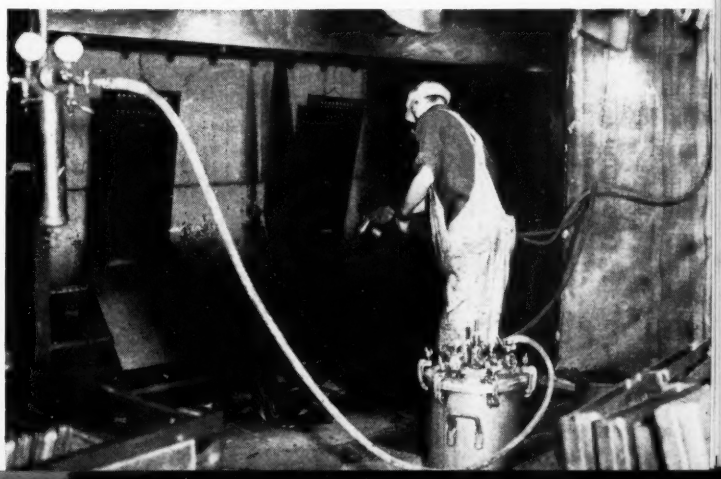

Fig. 3—A close-up of one of the Mahon Hydro - Filter Spray Booths. DeVilbiss equipment provides the means for applying enamel to the work.

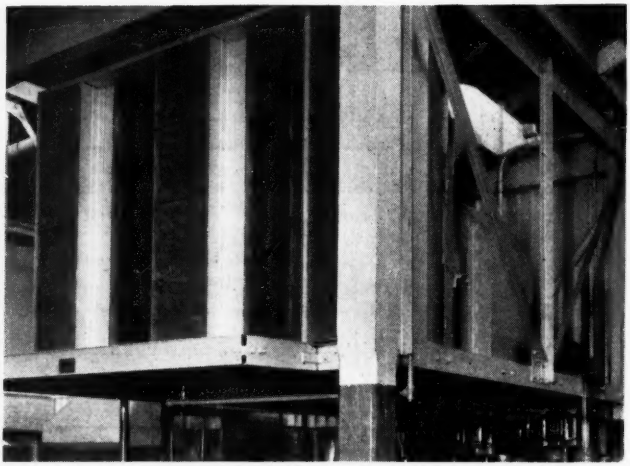

Fig. 4—The air which is supplied to the finishing department passes through the conditioning equipment shown in this illustration.

ber to be dried. The heated air in this chamber is recirculated by means of an automatic heat exhauster, which is located directly above the gas burners that are used to heat the oven. The air is heated by means of three automatically controlled gas units to a temperature of 300 degrees. The average rate at which the panels pass through the cleaning, rinsing, and drying operation is 600 to 650 per hour.

An illustration showing workmen removing dried-off panels from the mesh conveyor can be seen in Fig. 2. The work is unloaded from the mesh conveyor from a point easily accessible to three other continuous conveyors, two of which carry approximately 80 per cent of the panels which are to be enameled through dip tanks and then over drip pans. The other conveyor carries the panels to be finished with synthetic enamel through two Mahon 10,000 c.f.m. Hydro-Filter Spray Booth units, one of which is shown in Fig. 3.

The Hydro-Filter Spray Booth makes use of a water screen which is located directly behind the conveyor on which the panels are hung. When the panels and the operator enter the booth begins to spray them, the excess spray from the gun is carried into the water screen located at the rear which washes it downward into a trough located at the base of the unit, from which place the accumulation of enamel can be reclaimed if desired. A sheet metal shield in front of the conveyor chain prevents

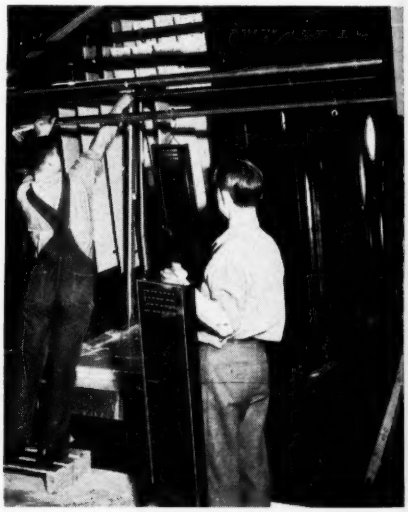

Fig. 5—The workman at the left is filling a special color order. He is shown hanging panels which have been dipped onto the crossbars of the oven conveyor. The workman at the right is transferring panels from the local spray booth conveyor to the oven conveyor.

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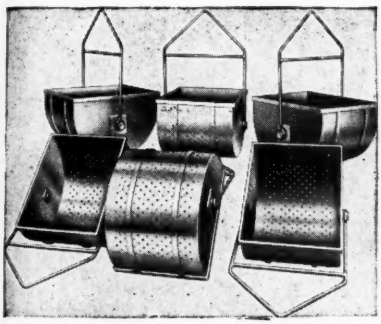

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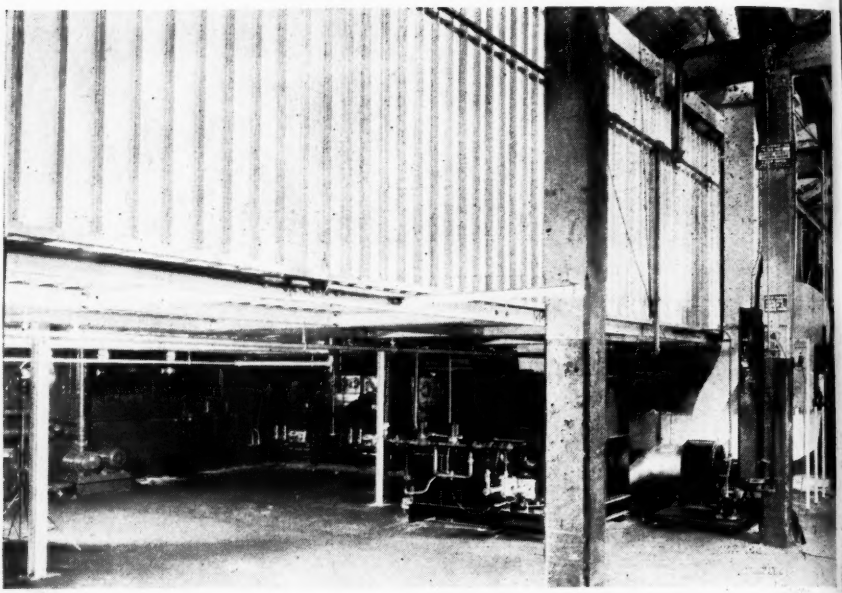


Fig. 6—View of one side of the baking oven showing the heating and control equipment located beneath.

the enamel spray from reaching the chain. This shield is coated with grease so as to prevent the spray from accumulating on it.

The Mahon Hydro-Filter Spray Booths, the unloading end of the cleaning machine, and the loading ends of the enamel baking ovens are all located inside a totally enclosed room. The room is provided with clean filtered air through a perforated ceiling directly above the Hydro-Filter Spray Units. A slight downward pressure of air is maintained in that section of the room at all times. A view of the conditioning equipment through which the finishing room is supplied clean filtered air is shown in Fig. 4.

Fig. 5 shows the loading end of one of the two baking ovens.

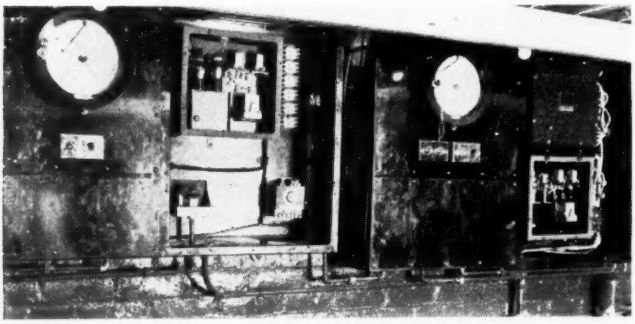
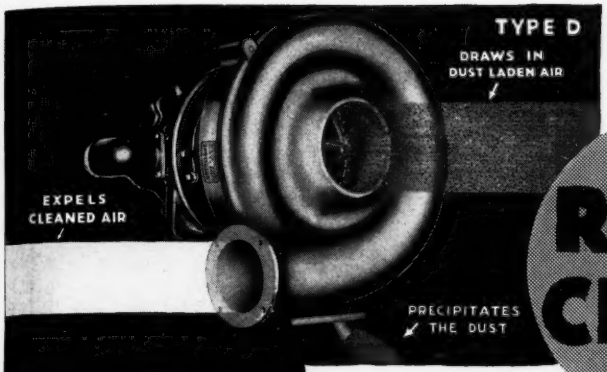
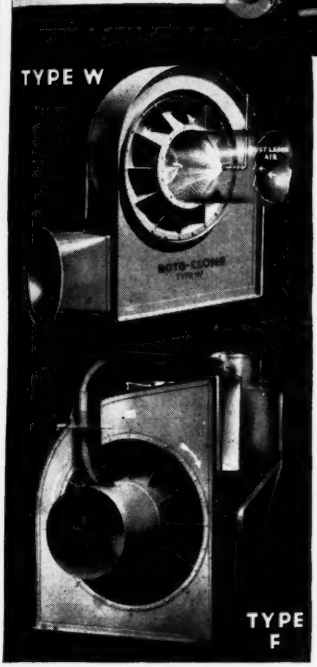


Fig. 7 — The instruments on this panel aid in controlling the heat of the ovens.



ROTO-CLONE



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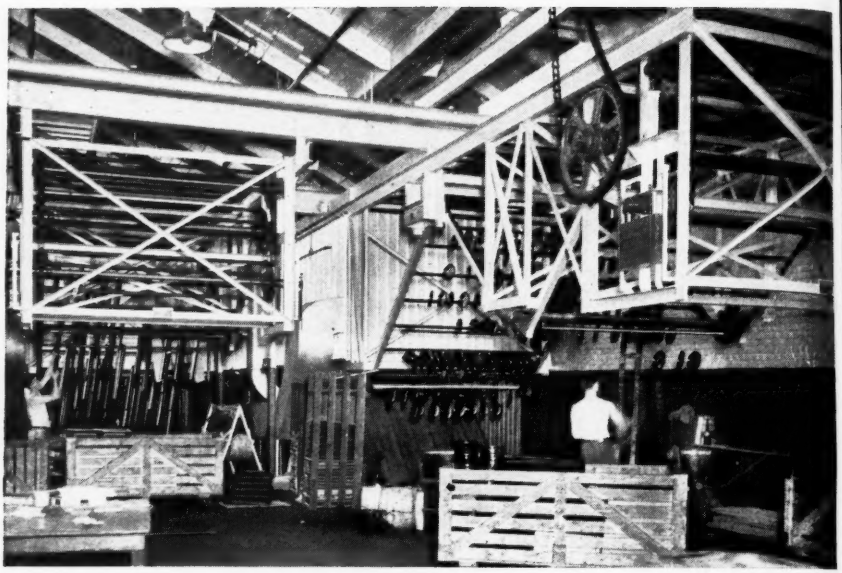

Fig. 8—Unloading the finished parts from the oven conveyors as they are discharged into the assembly department.

After the panels have been sprayed in the spray booths, they are loaded on the oven conveyor at this point. Where a special color is desired, the panels are dipped in special shallow tanks and then hung on this conveyor to follow through the same baking process as the sprayed panels. However, when the majority of the parts in process are to be dipped, they are automatically passed through dipping tanks while on the conveyor prior to their passage into the baking oven.

A view of one side of the oven is shown in Fig. 6. Beneath the ovens the instrument control panels, recording meters, heating and blower units are located. The two instruments shown in Fig. 7 are Brown Heat Recorders. One is provided for the oven which is maintained at a temperature of 500 deg. and the other for the oven which is maintained at 300 degrees. A Microflex located at the right of the panel shown in the illustration electrically starts and automatically controls the gas-fired indirect heating unit for the baking ovens. The instruments on this panel are representative of the latest developments in automatic safety and control equipment.

The ovens are so arranged that the discharge ends protrude into the assembly department, as shown in Fig. 8. The end of the oven through which the dipped enameled parts pass is shown at the right and that through which the sprayed parts pass is shown at the left. The difference in the length of these two ovens is approximately 18 feet, since the dipped enameled parts require a slightly longer baking interval. The conveyors used in the entire installation are manufactured by the Service Conveyor Company.

This enamel finishing installation is an outstanding example of straight line production methods in modern

finishing; it is very compact, well designed to the manufacturer's production plan, and from the standpoint of appearance does credit to both the United Stove Company and the R. C. Mahon Company.

"Challenging the Infinite—Finding the Appropriate—Achieving the Ultimate." This is the title of an attractive book on industrial coatings which is now being issued by The Stanley Chemical Co., East Berlin, Conn. Through photographs and descriptive matter, the reader is taken on a personal tour of the plant where he can observe the facilities and equipment of The Stanley Chemical Company. Starting with research and control laboratories which are the heart of the business, the reader is taken step by step from the checking of raw materials, through the formulation of new coatings and on to the production department to the point where the finished materials are ready for shipment. In this way, the reader is able to absorb in a comparatively short time what would require several hours on an actual plant tour.

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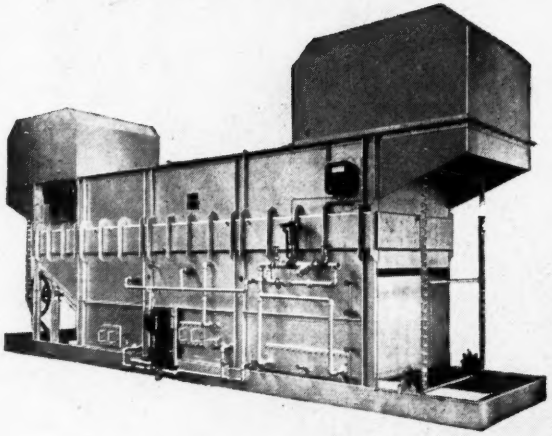

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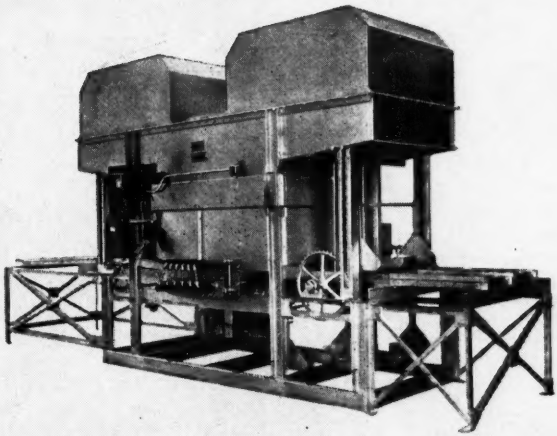

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Barrel Finishing of Metal Products

Ninth Article of Series—Description of Compressed Air Burnishing Material Loader.

By H. Leroy Beaver

IN the July issue of PRODUCTS FINISHING, readers of this series of papers will recall there was offered a "Barrel Burnishing Questionnaire", and among the questions therein noted being the following:

Is compressed air available in your burnishing department of at least fifty (50) pounds pressure per square inch?

It was stated in explanation that the question had reference to a simple device for re-loading the metallic burnishing materials into the barrel after the completion of the burnishing operation.

We have had so many requests for details of the device that, instead of writing each individual, we will undertake a description of the lay-out so that those who were sufficiently interested to write or telephone, as well as any other readers might avail themselves of the information for application in their plants. Ordinarily, a paper such as this would be accompanied by an outline drawing, but to adequately portray it in detail would require too much space. For the benefit of those interested and to whom the explanation might not be sufficiently lucid to enable them to proceed, we have had a tracing made and will gladly supply a blue print on making application to PRODUCTS FINISHING.

First we must get the proper set of the unloading pan in use under your burnishing barrel. This is now probably flat and sloping slightly toward the front of the barrel to permit better drainage. This pan should be tilted so that the water and burnishing material will flow toward the near right hand corner of the pan as you face the burnishing barrel. In this corner, two outlets or drain pipes must be mounted, one of which must be screened so that the burnishing material will not be lost down the drain and the other left open so that the burnishing material may have a free flow into the re-loading device.

If, however, the burnishing soap lubricant solution is desired to be used on more than one load of parts, the water drainage outlet should have a plug so that the burnishing liquid as well as the metallic burnishing materials may be blown back into the barrels, and the water drainage outlet be opened only when the burnishing solution turns from white to a slightly slate-gray color. So long as the soap solution maintains its white color and has the proper lubricating "feel" familiar to all experienced barrel operators, it need not be discarded after each load, but may be used on several loads.

Now in order to make up your working plan perhaps it would be best to have before you a sheet of paper on which you can roughly

sketch in an outline of your burnishing barrel whether it be the high and narrow Abbott Type or the long and narrow Baird Type. Then show in your sketch the unloading pan just as it is mounted beneath your barrel. Now it will be best for you to go to where your barrel is installed and measure the over-all length of the pan, and also the heighth to the opening of your barrel when it is in the loading position. First your pan must be elevated at least three inches above the floor to provide for gravity fall of the metallic burnishing material into the Tee which is in reality the feed hopper of the re-loader, and the first horizontal tube or pipe may run under or along one side of the pan.

Different operators prefer different places for locating the riser tube or pipe, most of them having it come up from the back of the barrel where it is always out of the way. In the case of double installations such as the double Baird machine, or double installations of any other types of barrels mounted closely together, the tube is brought up in the center and one re-loader serves two barrels. Another alternative in case of larger installations is to so arrange your pans that the feed outlets into the hopper may be plugged, then by having the re-loader mounted on a caster base, it may be rolled from one barrel to another, and a flexible air hose of the proper capacity used to convey the air supply to the re-loader.

Now to a description of the re-loader itself and of its component parts. We start first with what we will designate as the hopper of the device. This consists of a galvanized "T" 2½ in. by 2 in. by 1 in. The 2½-in. end is the muzzle and a regular 2½-in. pipe plug is first drilled through the center and tapped for

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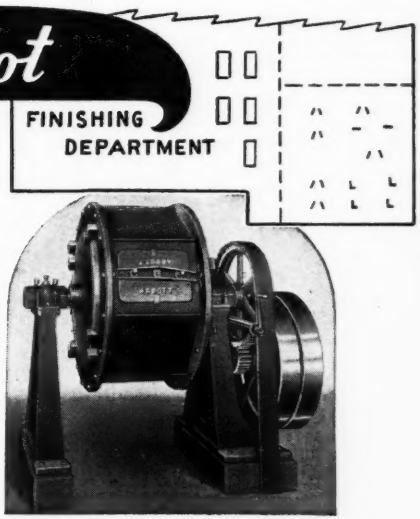

ABBOTT BALL BURNISHING

a ½-in. threaded pipe. Next, a section of ½-in. pipe should be threaded so that when the plug is screwed into place, the ½-in. pipe can then be screwed in until its end comes as nearly as possible flush with the 1-in. inlet of the "T". This 1-in. inlet must always face upwards when the loader is mounted under the unloading pan or at an angle of at least 45 degrees when the re-loader is mounted alongside the unloading pan.

A lock nut should be used on the ½-in. pipe that leads through the 2½-in. pipe plug, and before assembling the loader complete, one may readily see when the end of the ½-in. pipe comes flush with the edge of the 1-in. inlet to the "T" and then the lock nut should be drawn up tightly against the face of the 2½-in. plug. The other end of the ½-in. pipe is threaded because the valve controlling the air pressure, which should be at least 50 pounds per square inch, is here attached, and this pipe should be of such length as best suits the operator,—and mounted in such a way that it does not constitute an obstacle on the floor in the working area around the barrel. The short section of 1-in. pipe that connects the re-loader with the unloading pan need not be threaded, but may be ground to a tight tapered "slip fit".

With the hopper assembly completed, the 2½-in. end of the "T" will now face the operator as he faces the barrel, and we are now ready for the first or horizontal piece of 2-in. conveyor tube or pipe. Personally, we prefer seamless drawn steel tubing on account of its lighter weight, but regular 2-in. galvanized iron pipe may be used, and the reader will note that the 2-in. opening of the "T" now faces toward the back of the unloading pan and the back of the barrel and it is here that the loading tube assembly begins. The loading tube is made up of three sections of straight tube or pipe and three bends that can all be firmly joined by proper unions or sleeves. The three bends must be on a radius of 16 in. to insure free flow of the burnishing materials (please note that ordinary pipe Ells will not function in this device). The length of the first or horizontal tube must be determined by the operator as to where he wants his elevating tube to rise, not forgetting the horizontal space occupied by the 16-in. radius bend, and the horizontal tube should pitch slightly upward. Once the tube is connected with the 2-in. outlet from the "T", the first bend is attached; then the second straight section or riser is attached and to this the second 16-in. radius bend.

The length of the third straight section is variable and its length must be governed by whether one or two barrels are to be served, but it must be such that when assembled and the final or third bend is attached, it will open downward directly into the opening in the burnishing barrel. This end, of course, should be high enough above the barrel opening to clear it and a piece of gasket hose long enough to reach at least from four to six inches into the barrel be attached to the end of the last bend with a suitable hose clamp. For a permanent mounting the tube or pipe lines may be fastened to the frame of the barrel support with suitable metal pipe clamps.

While we specify an air pressure of fifty (50) pounds at the hopper, it may not require this much, and again if the reach is longer it may require slightly more, but this can be gauged by the operator and only enough air pressure should be used as to smoothly convey the burnishing material through the tube assembly back into the barrel.

On first thought it might occur to the reader that this device serves

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but one function and that is to return the metallic burnishing material back to the burnishing barrel after each operation is completed, but in reality it serves three:

First. It eliminates the labor of using a scoop shovel to return the burnishing material to the barrel, and while the loader is in operation the barrel operator is relieved for other work or to prepare his next load of parts to be burnished.

Second. It very materially prevents spillage of the steel burnishing material as when scoop shovels are used and the consequent waste and spoilage of burnishing material.

Third. It effects, when the barrel is properly operated, a very material saving in the quantity of soap used.

Naturally, when formed burnishing pieces are used, in case of their being accidentally spilled, they will remain in a very restricted area, that is, they will not roll, but in the case of round balls when they are accidentally spilled, they will roll almost unbelievable distances and into remote corners, under benches, and so on. This spilled material being wet, will quickly rust, which in turn will form rust pits on the surface, and even a small portion of this pitted material in a burnishing mass may well mean the difference between a good and a poor finish. If spilled burnishing material is not gathered up the same day the spillage occurs, it is never safe to add it to the mass later, and a far better practice is to discard it entirely as waste material.

Now as to the third—a saving in the quantity of soap used. Readers of this series of papers will recall that at every suitable opportunity we have stressed the importance of keeping the inner barrel surfaces, the metallic burnishing materials and the parts to be burnished, scrupulously clean. Now if another of our recommendations is followed, that of keeping the burnishing soap lubricant of a creamy consistency so that it flows easily instead of being a tenacious soapy mass, you will find that the soapy lubricant can be used on at least three loads of material or parts instead of one, because the soap lubricant can be returned to the barrel by air pressure along with the metallic burnishing material, and this provides practically instantaneous lubrication to the second and third lots of parts to be burnished. If the burnishing soap you use is an efficient and proper one and the correct proportion of soap and water is used, it is practically impossible to exhaust the lubrication value of the soap solution in burnishing a single lot of parts.

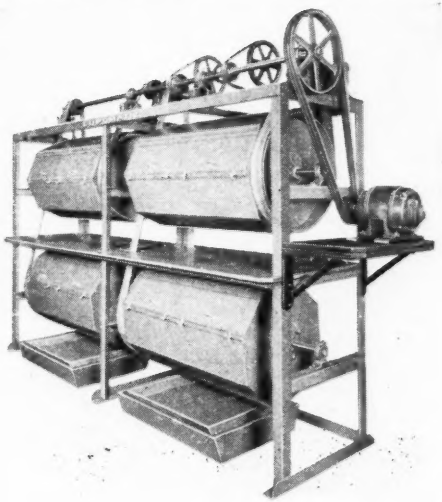
That there is an actual need for at least semi-automatic equipment whether compressed air or bucket type conveyor is used may be aptly illustrated by a case where we were called in consultation only last week. Here we found a double installation of 12x48 long and narrow type barrels, each of which was originally put into operation with but 150 lbs. of round balls as a burnishing material load only about two weeks ago, instead of a load of 450 lbs. of burnishing material that such size and type actually requires. Into this barrel with its 150 lbs. of burnishing material (12 quarts) the operator was running almost a bushel of parts which were not self-burnishing in character, whereas a load of six quarts would have been maximum. With each load they were using 1½ lbs. of flake soap and then filling the barrel with water. While the barrels themselves were splendidly designed, under such conditions, satisfactory burnishing results were impossible. To correct this, we added 300 lbs. of formed burnishing material instead of round balls to each barrel, cut down the water to one-third of what had previously been

used, added but three ounces of flake soap per load, and the barrels are now functioning beautifully.

The point, however, we would stress is this: That using a scoop shovel for re-loading the barrels, in a period of only two weeks, the load of burnishing balls had dwindled from 150 lbs to 124 lbs., or a loss by spillage of 26 lbs which, if figured at 30 cents per pound, would more than cover the cost of the materials required for the installation of a compressed air loader. When we consider that a quart of burnishing materials averages 12½ lbs., we can easily see that not many scoop shovels full may be spilled and lost before it starts to run into money, because only one quart at 30 cents per pound means a loss of $3.75. In this particular case there is a compressor of 150 lbs. capacity mounted within twenty feet of their burnishing barrel installation. Needless to say that compressed air re-loading is being installed this week.

As we have before stated, the purpose of all of these papers and the reason PRODUCTS FINISHING is publishing them is solely to bring barrel burnishing operations generally to a higher and more efficient level, to provide the maximum of results at the minimum of operating costs. In the case of compressed air loading, if the reader has any doubts as to just how to make the installation he need only send a pencil sketch of his barrel installation to PRODUCTS FINISHING, and we will pencil in the necessary detail. The whole idea of using compressed air is not new in any sense for it only applies to barrel burnishing operations the same principles of material elevation as used by the farmer in filling his silo, or in conveying sand, sawdust and other materials using compressed air as the pressure medium.

A NEW PROCESS *for*



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Solvent Degreasing

By Dr. C. B. F. Young

Consultant; Instructor, Columbia University; Lecturer, New York University.

OILS, fats, waxes, greases, gums, are used to aid the operations —involved in the shaping, drawing, machining, stamping, oil tempering, cutting, and threading of metallic objects. Before these objects can be pickled, plated, enameled, lacquered, galvanized, tinned, painted or japanned, it is essential that the organic compounds be removed. True, most of these materials can be eradicated by alkali cleaners, but time is required and the time element must be considered.

A very important development in the last decade has helped to solve this situation. Heretofore gasoline, benzene, kerosene, carbon tetrachloride, and so on, were used to dissolve the different oils and greases but this type of cleaning was never very successful due to a group of unfavorable conditions which would make any process impractical from the economical point of view. These were inflammability of solvent, health hazard, loss of solvent due to evaporation and contamination, and poor cleaning resulting from the contamination of the solvent with the products removed. Thus, degreasing was a type of cleaning used only for special occasions, waiting for new solvents to be developed which would have the following properties:

Chemical

1. Non Inflammable.
2. Will not support combustion.
3. Chemically inert to the attack of metals.
4. Will not decompose on transformation to different phases.
5. Non toxic.

Physical

1. Boiling point below 100° C.
2. Will clean in hot, cold, or vapor state.
3. High specific gravity of liquid (low surface tension).
4. Volatile (low specific heat).
5. Vapors heavier than air.

Due to researches in organic chemistry, new compounds have been developed having certain properties which makes them valuable as solvents. Among these are the clorinated hydrocarbons such as perchlorethylene and trichlorethylene. Let us look at the properties of the last mentioned—trichlorethylene:

Chemical

1. Non Inflammable.
2. Will not support combustion.
3. Does not attack metals or fabrics even in the presence of water.
4. Does not decompose when changed from solid to liquid to gaseous state.
5. Stable under normal conditions.
6. Non toxic if used with discretion.

Physical

1. Boiling point 87.1 deg. C.
2. Will clean if cold or hot or in vapor state.
3. Specific gravity 1.46.
4. Volatile (Specific heat, 228 calories per gram).
5. Vapors are 3.8 times heavier than air.
6. Dissolves grease, oil, wax, parafin, tar, sulfur, gum, and so on.

In comparing the data above, it will be seen that trichlorethylene corresponds to the theoretical requirements very closely.

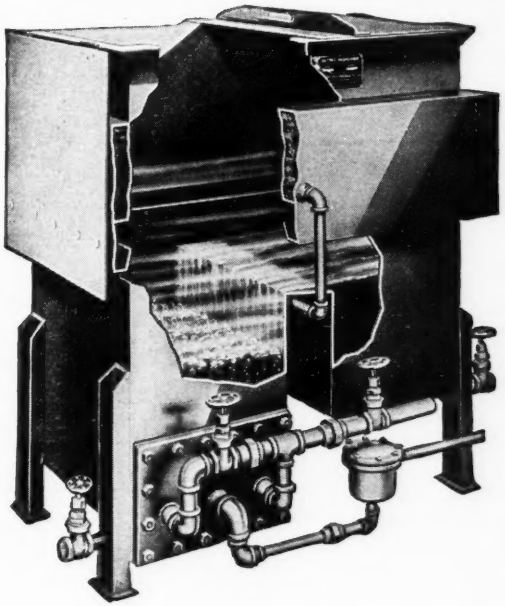

Fig. 1—Cut-away view of a size 624 two-dip Detrex degreaser.

(*Photo courtesy Detroit Rex Products Company*)

Principles Involved

The power for cleaning by solvents is derived from the fact that the liquid used forms a homogeneous mixture with the material which is to be removed and the resulting solution flows off the surface which is to be cleaned. It should be noted that such a process is quite different in principle from the alkali cleaning method in that no chemical reaction takes place or no emulsion is formed. The action is almost instantaneous, therefore the time element is reduced to a minimum.

The trouble with solvent cleaners in the past was due to the fact that as foreign materials were removed, they remained in solution. The impurities increased until a concentration was reached where very little cleaning was obtained. In order to obtain a clean surface it was necessary to remove the contaminated solvent and replenish with clean material. Such a process demanded the change of solvent frequently which made it uneconomical. True, the solvent could be recovered, but the hazards of refining such materials made the cost prohibitive for degreasing in general.

Research has produced, not only new solvents, but also better methods of applying these materials so as to produce a clean surface. Instead of introducing the work to be cleaned into the solvent, the liquid is heated to the boiling point and allowed to condense on the cool surface of the metallic objects. In this way, only the clean solvent comes in contact with the metallic surface due to the fact that the solvent vaporizes at 87 deg. C. while the oils, fats, waxes, and so on, have a much higher boiling point; therefore there is no chance of contamination as the condensate is always pure. Of course, there are many forms and combinations of solvent degreasing, but each will be discussed later. At this point, the general theory behind the cleaning will be considered.

It will be noted that the solvents are used near their boiling point to decrease solvent losses to prevent contamination of the solvent and not because of any cleaning action obtained at the higher temperature. In this way, solvent degreasing differs

materially from other methods using gasoline, benzene, or similar compounds which are used at room temperatures to decrease the fire or health hazard.

One of the simplest forms of solvent degreasing consists of introducing the metal to be cleaned into the concentrated vapors of the solvent obtained by heating the liquid to its boiling point. The resulting vapors are condensed in another part of the apparatus in order to prevent loss of solvent, therefore lowering the cost of operation. Thus, it can be seen that the degreaser will consist of two parts. The first or lower portion is a reservoir or heating chamber containing the solvent, while the second or upper adjoining compartment catches and retains the vapors generated from the heated solution below. Near the upper portion of the vapor chamber, water cooled surfaces are maintained so that all vapors which rise above a certain line are condensed to the liquid state. It is in this compartment that the metal to be cleaned is introduced.

Analyzed, it will be seen that the unit operates in the same manner as a still. The solvent container or sump acts as the heating compartment and may be heated by steam, oil, gas, or electricity, while the upper adjoining section, with its water cooled portions acts as a saturated vapor shaft and condensing column. The cool metallic object to be cleaned, introduced in the vapor compartment, also condenses the gaseous phase. The liquid thus formed on the surface to be cleaned dissolves any oil, grease, wax, and so on, and washes the resulting solution into the sump or liquid reservoir. This condensation action continues at a rapid rate until

(Photo courtesy G. S. Blakeslee & Company)

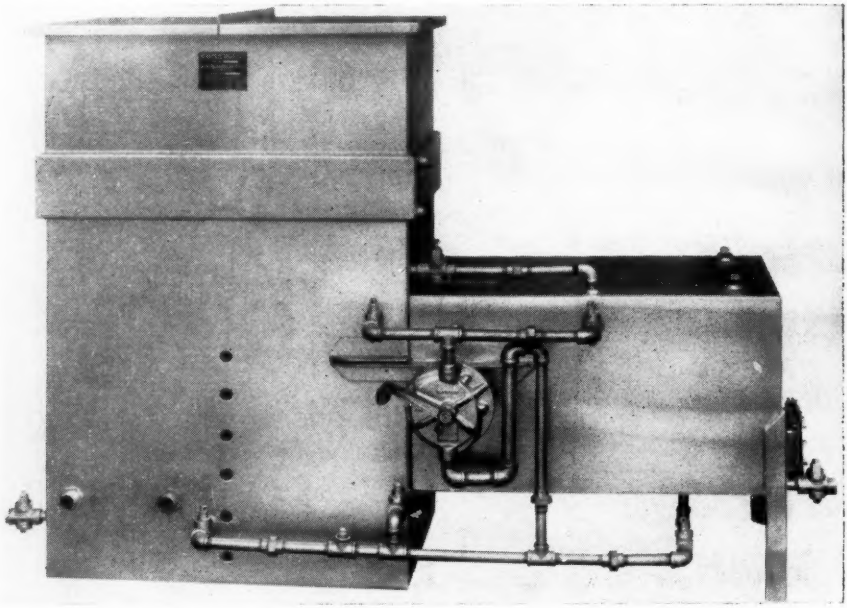

Fig. 2—Model RS degreaser for cleaning small parts in a small shop.

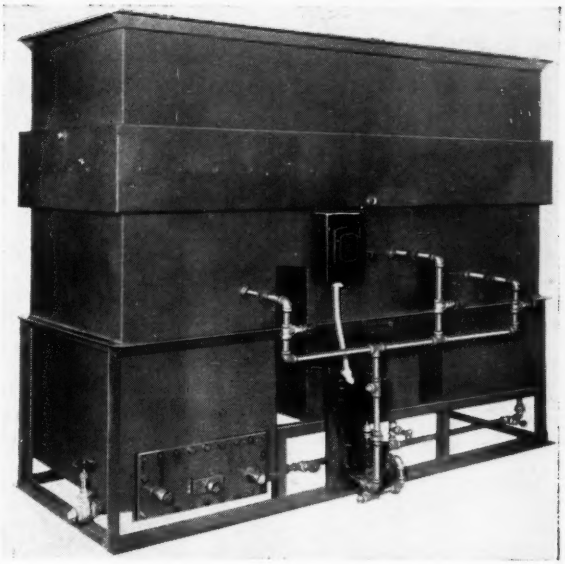

Fig. 3—Standard model of a three-dip Detrex degreaser.

(*Photo courtesy Detroit Rex Products Company*)

the metallic object is raised to the temperature of the surrounding area. At this point, very little vapor is condensed and the metallic object can be withdrawn both hot and practically dry.

It must be pointed out that at this point cleaning action does not stop as some authors would have us to believe, but the action ceases to be as rapid as heretofore. If the time element is considered, which is always the case, vapor degreasing will depend on the ratio of the weight of metal to its area, the specific heat of the metal, the latent heat of the solvent, and the temperature difference of the metal and vapor phase of the solvent.

If the ratio "weight of metal" to "area of metal" is large, the material will be cleaned by vapor degreasing very easily, and objects having small ratios will not be cleaned as well. For this reason, the metal should have a weight at least two pounds per square foot. This is about the thickness of No. 18 gauge. In many cases, the metallic object to be cleaned is immersed in the boiling solution and then raised to the saturated vapor chamber. This first operation dissolves most of the foreign material, while the second rinses the object in pure solvent, thereby producing a clean surface.

It will be noted from the discussion below that the so-called "drag out" of the solvent is reduced to a minimum provided the proper procedure is followed. Care must be taken to see that the loss of the vapors escaping is reduced to a minimum, as this constitutes the largest single cost of the process. This is brought about by having suitable cooling surfaces which are properly placed, and the smallest possible exposed area of solvent.

One of the greatest losses of solvent is due to the diffusion of air and solvent as this mixture is almost impossible to control and too costly to recover. This loss will always be present but can be reduced to a minimum by observing certain facts. If the area of the gaseous liquid interface is kept at a minimum, the loss due to diffusion will reduce materially. Therefore, the

area of the vapor in contact with air is made as small as possible, the limiting factor being the size of the largest item or group of items which has to be cleaned in the operation. The degreaser should be large enough to completely immerse these articles or group of articles.

It is obvious that machines having more than one compartment are not as efficient to operate as those having only one. Therefore vapor degreasing is preferred if there is a choice in the matter. However, certain cases arise where it is better to sacrifice efficiency and obtain volume cleaning.

From the above consideration, it can be seen that the design of equipment is a very important matter and expert advice should be obtained before any type of degreasing is installed. If poorly designed equipment is used, vapor losses will be high and cleaning costs will naturally be expensive.

Time plays an important part in all cleaning and is reduced to a minimum in solvent degreasing due to the fact that no chemical reaction takes place. Therefore one would expect the time element to be at a minimum in the degreaser. This period is from fifteen to one hundred and twenty seconds. Several variables can lengthen this interval, however, and should be considered, first, the design of the machine which has been discussed, and second, the heat input. This should be capable of raising the temperature of the objects to the boiling point of the solvent in this period, otherwise the material will be withdrawn wet, resulting in the loss of solvent, or allowed to remain until heated to this temperature which will take more than the alloted time. Therefore, it is rather easy to see that the volume of work passing through the cleaner is not only subject to the volume of capacity of the machine, but also to the heat input. In many machines, it will be possible to increase the capacity by merely increasing the heat input, all other things remaining constant.

Cost of Process

It can be understood very easily that the cost of such a process will depend upon the design of equipment, human element (if manually operated), shape of the articles being cleaned (drag out), type of foreign material being removed, type of machine used (liquid phase, vapor phase, and so on), time element, source of heat (gas, steam, or electricity), racking of work, premature removal of work, failure to recover used solvent and capillary attraction between adjacent surfaces.

The "drag out" of any machine will vary directly as the shape of the article and in some form of work, the solvent loss from this item is the largest single loss encountered in the operation of degreasers. The average loss of solvent including all losses, is about 0.16 lb. of solvent per pound of metal cleaned, while the cost will vary $.05 to $.15 per 100 lbs. of work. It must be borne in mind that these figures are general throughout.

In order to produce 500 lbs. of work per hour for an eight hour day, let us assume that there is 50 gallons of solvent in the boiling chamber and 50 gallons in the rinse chamber. 782 lbs. of steam at 15 gauge will be utilized, while 1520 gallons of water per day will be used for cooling. From these figures it is rather simple to obtain an idea of the cost of operating a degreaser in different localities.

It should be understood that degreasing is a method for removing oil, wax, and grease and not a method for removing any kind of foreign

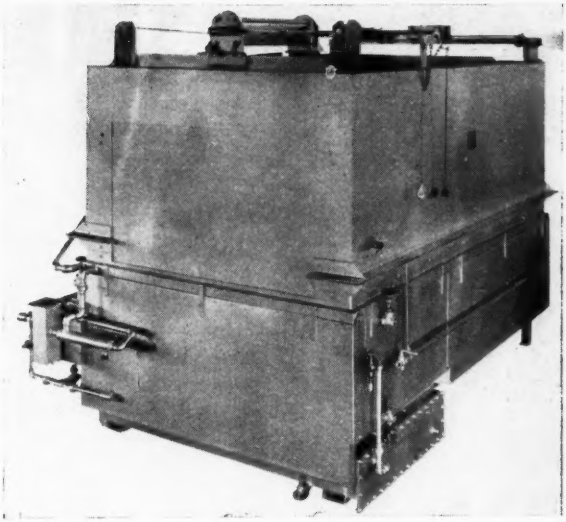

Fig. 4 — Semi-automatic hydraulic lift degreaser in which the end panels of the machine are automatically raised at the time the work is introduced into the machine.

(Photo courtesy G. S. Blakeslee & Company)

materials. In the first place, the method works best on metals having small areas and large volumes due to the fact that the object being cleaned acts as a condenser and as soon as the condenser reaches the temperature of the vapor, very little condensation is formed. Another criticism is that solids held by grease film are not removed. A good example of this is the buffing compounds which have metal particles suspended in their films. The grease is dissolved leaving behind the insoluble abrasive polishing compounds and insoluble lubricants. The removal of this product is now harder than ever to accomplish. Another objection to this type of cleaning is that very little scrubbing effect is obtained. While in electrolytic cleaning, the hydrogen, released in a gas, continually rubs the metallic surface.

Many times soaps and other water soluble products are used on metals and these compounds are insoluble in chlorinated hydrocarbon. Sulphonated oils should not be removed in degreasers due to the fact that these oils will hydrolyze and produce sulfuric acid which will later attack the metallic surfaces of the metal being cleaned, causing discoloration and loss of mirror surface. This free acid will also aid in the decomposition of the trichlorethylene.

True, degreasing has its place in the cleaning of metals and will continue to gain ground, but it must be kept in mind that degreasing does not give a chemically clean surface and therefore should not be used immediately prior to electroplating. It can be used, however, to advantage by preceding the electrolytic cleaner. In this way it has proven very beneficial where appreciable amounts of oil, grease, and so on, are on the work because of the decrease in time necessary for the work to remain in the electric cleaner. It can readily be understood that oil or grease can be dissolved much quicker than it can be saponified or emulsified. In this way time, chemicals, electric current, heat, and labor can be saved.

Trichlorethylene is inert chlorinated hydrocarbon at ordinary temperature, but under certain conditions will decompose. This generally results in the formation of at least two compounds which are detrimental to the successful operation of the solvent. These materials are free car-

bon and hydrochloric acid. The carbon deposits around the heating coils or sides of the container and prevents good heat transfer. This, of course, results in the introduction of more B.T.U. per pound of work, which increases the cost of operation and also results in local overheating. The hydrochloric acid resulting, attacks the surface of the metal being cleaned, destroying the surface of same.

It is a well known fact that aluminum chloride has a catalytic effect upon the decomposition of trichlorethylene and this material should be kept away from the solvent. It so happens that many aluminum parts which are machined have small particles or chips of the metal encased and these are released when placed in the degreaser. The hydrochloric acid already formed attacks the chips and fillings, forming aluminum chloride and the resulting chloride, in turn decomposes more of the trichlorethylene. This cycle continues until appreciable amounts of the solvent are decomposed. The reaction, if allowed to continue, will produce an explosion. Several explosions of minor character have happened. The remedy is simple, however. The aluminum chips or filings should be kept at a minimum in the solvent. This can be accomplished by cleaning the degreaser at least once a week.

Acids may also be introduced into trichlorethylene by cleaning metallic objects which have been subjected to a soldering operation. If care is not taken, the acids used for cleaning purposes, will not be completely removed before the object is introduced into the trichlorethylene. This can be overcome by carefully washing the articles in water before degreasing. The amount of acid can be determined by chemical methods. If detected, this can be neutralized and filtered or the solution can be distilled and the solvent recovered. Stills for recovering the solvent can be purchased from any of the manufacturers of degreasing machines, or from firms manufacturing this type equipment.

Trichlorethylene is stable at temperature of 20 deg. C. above its boiling point, but if heated above 125 deg. C. decomposition sets in with the production of hydrochloric acid and free carbon. This will seldom happen to the bath as a whole, but may occur due to local overheating, that is to the solution immediately surrounding the heating surfaces. This can be prevented by keeping carbon away from the heating pipes. Another property of the trichlorethylene which is interesting is the fact that it decomposes rather rapidly when exposed to ultra violet rays, therefore this material should not be exposed to strong sunlight. Trichlorethylene will not burn or support combustion, but the vapors will decompose if exposed to an open flame.

Toxity

Reports vary concerning the physiological properties of trichlorethylene, but the explanation of this seems to be that the different investigators used materials with varying amounts of impurities. This solvent does not have detrimental effects upon the human skin except that it dissolves the lubricant which results in the peeling and cracking of the surfaces. The vapors when inhaled in excessive quantities, produce a dizzy drunken feeling similar to all volatile solvents.

Underwriters Laboratories proved that guinea pigs exposed to two hours of concentrations up to 1 per cent by volume of trichlorethylene vapors in air did not in any case prove fatal. Furthermore, the animals appeared normal during a ten day observation test. If the guinea pigs were exposed for one hour to a 2 per cent volume of carbon tetrachloride vapor in air,

all pigs died; if however, the above experiment was repeated using trichlorethylene instead of the carbon tetrachloride, no apparent permanent effects were observed. Undoubtedly the information that trichlorethylene is more toxic than carbon tetrachloride is untrue.

It is a very good policy to consider all vapors except air as toxic. With this in mind, it is best to keep the concentration of trichlorethylene vapors as low as possible in the atmosphere of the workmen.

The design of present day equipment is such that very little worry is derived from this point of view. Where the trouble lies is in the fact that the workmen operating the degreasers become careless and allow the vapors to fill the room.

Schneible Multi-Louver Dewatering Tanks. The Claude B. Schneible Company, 3951 Lawrence Ave., Chicago, Ill., is now issuing a bulletin on their Rectangular Type Multi-Louver Dewatering Tanks for precipitating and dewatering the sludge from Schneible Multi-Wash Dust Collectors. This type of unit is in addition to the line which includes elevated cylindrical dewatering tanks that discharge sludge into tanks. Rectangular Type Multi-Louver Dewatering Tank is for use in connection with small wet dust collecting systems that do not justify large truck or gondola-type tanks. Copy free upon request.

"Pyramid Snap-On Mouldings." This is the title of a 12 page bulletin which is now being issued by Pyramid Metals Company, 455 N. Oakley Blvd., Chicago, Ill. Sizes and specifications are listed in tables and appropriate illustrations give the reader visual examples of the adaptation of Snap-On Mouldings.

Pyramid Snap-On Mouldings are available in stainless steel, copper, bronze, brass, and aluminum. Bright mirror and satin velvet finishes may be had on all these metals. Copy free upon request.

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NORTON ABRASIVES

the FINISHING FORUM

Question: Our finishing process consists of plating polished cast iron parts with copper, buffing the copper, plating and buffed copper parts with nickel, buffing the nickel, and finally plating chromium on the nickel. Frequently we experience blisters in the copper plate. We also get some peeling or lifting of the nickel plate off the copper when the chromium is applied. What causes these defects and how may they be corrected?

Answer: Blisters in the copper plate from a cyanide copper solution may be caused by excessive current density, excessive free sodium cyanide content, excessive sodium thiosulphate or "hypo" content, and poor cleaning. The most usual cause of trouble is in the cleaning since the possible variation of the other factors is so great. The current density may vary from 10 to 40 amperes per square foot. The "free" or "excess" sodium cyanide content may vary from 0.5 ounces per gallon to 2.0 ounces per gallon. The "hypo" content is somewhat critical, and it is well not to add more than 1/64 ounce per gallon at any one time. When the plate gets too red, another small amount of "hypo" may be added. This factor can be controlled very well by observation of the plated work. A fairly strong alkaline cleaner is required to remove polishing grease from iron castings. A very good cleaner can be made by dissolving 6 ounces trisodium phosphate, 1 ounce caustic soda, and 2 ounces soda ash per gallon of water. The cleaner may be strengthened from time to time by the addition of caustic soda. If it is possible to control the cleaner by chemical analysis, the total alkalinity should be maintained at about 2 ounces per gallon calculated as sodium hydroxide. A typical cleaning and plating cycle is as follows:

1. Clean electrolytically 5 minutes with direct current
2. Scrub with sand or pumice stone
3. Cold water rinse
4. Pickle 1 minute in 10 per cent muriatic acid
5. Cold water rinse
6. Copper plate 30 to 45 minutes at 20 amperes per square foot

The peeling or lifting of the nickel deposit from the copper may be caused by high pH in the nickel solution, excessive current density, and improper preparation of the copper surface to be nickel plated. The proper current density to use will depend upon the type of nickel solution in use. In cold nickel solutions, the current density usually varies from 5 to 10 amperes per square foot. In hot nickel solutions the current density may run as high as 40 amperes per square foot. If the plate is ductile and buffs out well, the current density used for the plate is correct. Usually no trouble from lifting is experienced as long as the pH is kept below 6.2 colorimetric. For most solutions the proper pH is around 5.9 and the exact value must be determined by experiment. The chief cause of lifting of the nickel from the buffed copper surface is improper cleaning of the copper surface. The same cleaner suggested above for

iron may be used to clean copper also. A further aid to good cleaning is a reversing switch on the copper tank so that the work may be made the anode or the cathode as desired. A good cleaning cycle is as follows:

1. Clean electrolytically 3 minutes with direct current
2. Brush with soft bristle brush to remove buffing compound
3. Cold water rinse
4. Hang in copper tank with no current for 1 minute
5. Reverse current for 5 seconds
6. Flash with direct current for 1 minute
7. Cold water rinse
8. Dip in 5 to 10 per cent muriatic acid
9. Cold water rinse
10. Nickel plate.

The reverse current tends to remove any foreign material from the surface that may not have been removed by the cleaner. The 1-minute copper flash produces a fresh, active copper surface upon which the adherence of nickel is far better than that on a buffed copper surface. The muriatic acid dip serves to break the highly alkaline surface film produced by the cyanide copper solution. This film is very difficult to remove by a water rinse alone, and is frequently the chief cause of peeling.

Answered by Ezra A. Blount.

Question: Can you outline for us a form of procedure in connection with the burnishing operation for rust prevention on burnished steel stampings that are carried in stock in compartment bins after the burnishing is completed. We understand there is some process or method that accomplishes this?

Answer: The simplest method we can recommend is for you to proceed as usual with your burnishing operation using the same amount of soap and water as at present but to each gallon of water add 4 ozs. Tri Sodium Phosphate and 4 ozs Sodium Cyanide. When you dump the load from the barrel do not rinse with water but separate the parts from the burnishing material and place the parts directly into the sawdust drying barrel. Even after drying you will find a thin protective film covering the parts that will resist oxidation or rust for a long time. As an alternate to the T. S. P. and Cyanide you may substitute 4 ozs. Sodium. Thiosulphate (hypo) to each gallon of water.

Answered by H. Leroy Beaver.

Oxidizing Brass

Editor Finishing Forum
Dear Sir:

We have used, with a marked degree of success, the following method for oxidizing brass. An amount of silver depending upon the desired shade, is added to nitric acid. The amount of silver added can be determined by experimentation or a simpler way is to drop a dime into a quart of the acid. The part to be treated is heated and then dipped into the silver and nitric acid solution. The workpiece is then removed from the solution and again heated until the green color disappears.

Since we didn't have very many parts to oxidize, we used a Bunsen burner for heating; however, for production work, a better method could be worked out.

After the second heating, the workpiece can be wiped and lacquered. The resulting color will last indefinitely, as we have some ornamental parts which are practically the same today as they were when treated by this method almost 40 years ago. The color obtained by this method is a very deep black. *O. F. Kleeb.*

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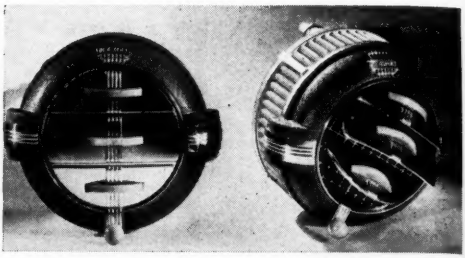
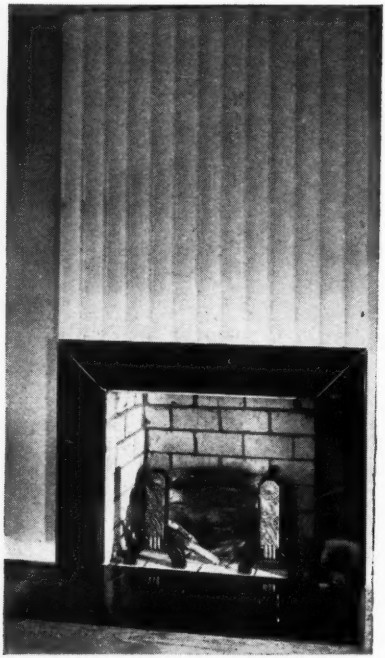
FINISHES THAT AID IN APPEARANCE AND UTILITY

(Right)—This beautifully styled hot water heater is finished in a soft tone of crystallized green gray enamel. The die-cast doors and grillwork are chromium plated.



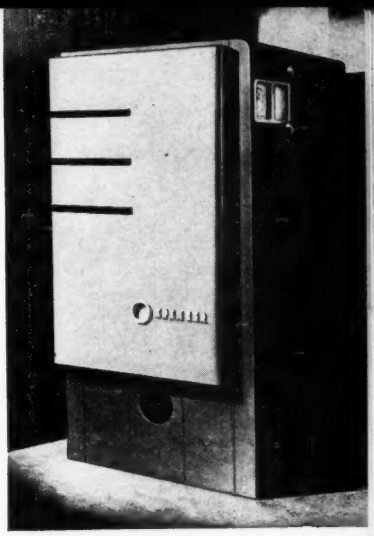
(Photo Courtesy McAleer Manufacturing Company)

(Photo Courtesy The American Rolling Mill Co.)

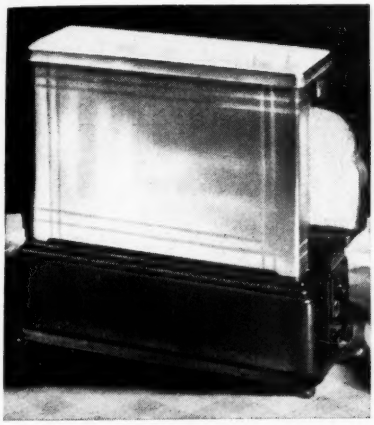


(Left)—Something new in fireplaces—black and white porcelain enamel on iron. This fireplace is easy to keep clean, and maintains a fresh, new appearance.

(Right)—To fit into the decorative design of basement rooms, the oil burning furnace presented herewith has been finished with a lustrous lacquer-enamel, in two shades of bluish gray for the large areas, with details in strong red and in polished aluminum.



(Photo Courtesy Maas and Waldstein Co.)



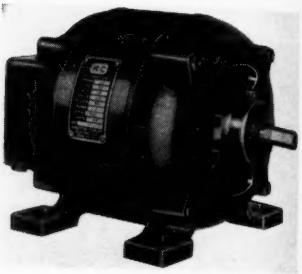
(Photo Courtesy American Nickeloid Company)

(Left)—A "built to last a lifetime" finish is found on this Toast-O-Lator which is made of pre-finished chrome steel.

(Right)—The case of this camera is made of an aluminum alloy and finished with a clear enamel which acquires an attractive crinkly appearance after baking.

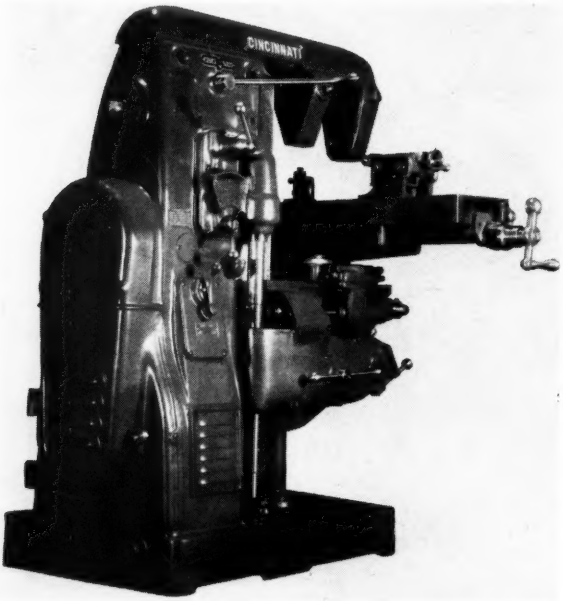
(Photo Courtesy Chicago Molded Products Corp.)

(Right)—The first finishing coat on this motor is Kem Mono bake primer and the second coat is black japan. The final finish is black finishing japan.

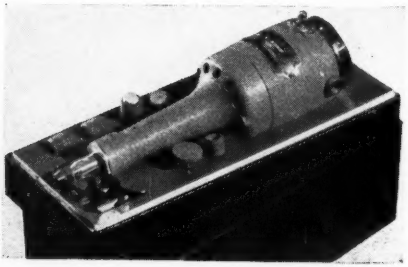


(Photo Courtesy Sherwin-Williams)

(Below)—Four coats of lacquer provide this milling machine with a beautiful and durable finish.

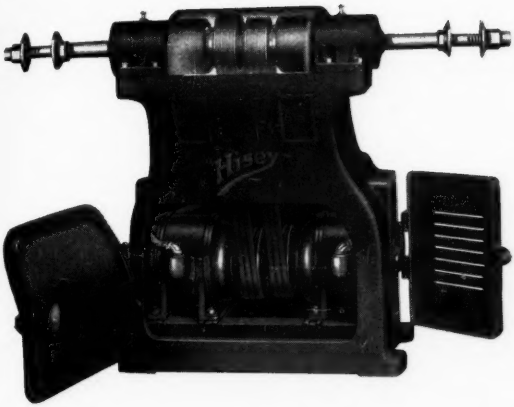


(Photo Courtesy Cincinnati Milling Machine and Cincinnati Grinders Inc.)



(Photo Courtesy The Dumore Company)

(Left)—The tan, crinkle enamel finish on this grinder will withstand a great amount of abuse without marring or chipping.



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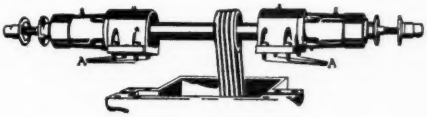

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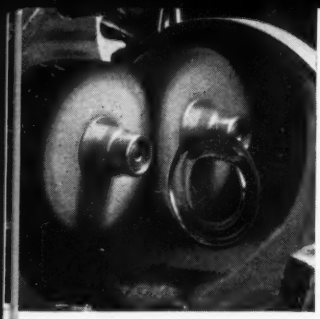


NEWS OF THE INDUSTRY

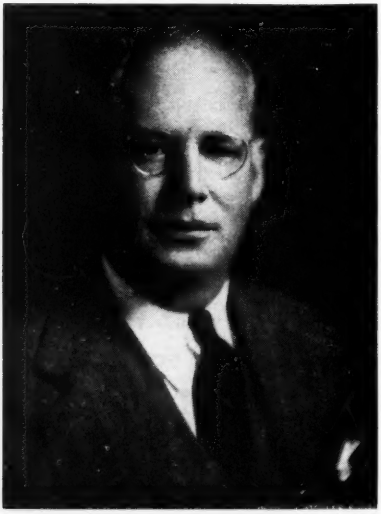
Bruce Puffer Joins Commercial Solvents

Bruce Puffer, formerly sales manager of the Industrial Alcohol Division of the American Distilling Company, has joined the sales department of Commercial Solvents Corporation, 230 Park Avenue, New York, N. Y., as a result of the recent transfer of the American Distilling Company's industrial alcohol business to Commercial Solvents.

Mr. Puffer has devoted many years to the sales of industrial alcohol and is a well-known figure in this field. He is a native of Minneapolis, Minn., attended Kenyon College, Gambier, Ohio, left college to enlist in the U. S. Army during the World War.

In 1920, because of his proven sales ability, he was selected to establish a branch office in Minneapolis, for the U. S. Industrial Alcohol Co. Later on, he was made manager of this company's office in St. Louis and was afterwards transferred to Cleveland. He remained with U. S. Industrial Alcohol until 1928, when he left for Detroit to join the sales organization of the Forbes Varnish Company, Cleveland, Ohio.

When the American Commercial Alcohol Corporation was formed in 1929, he became assistant sales manager of this organization, covering the territory from Cleveland east, with headquarters in Philadelphia. In 1932, he was appointed sales manager of the Industrial Alcohol Division of the American Distilling Company, a subsidiary of American Commercial Alcohol, and moved to New York City.



Bruce Puffer

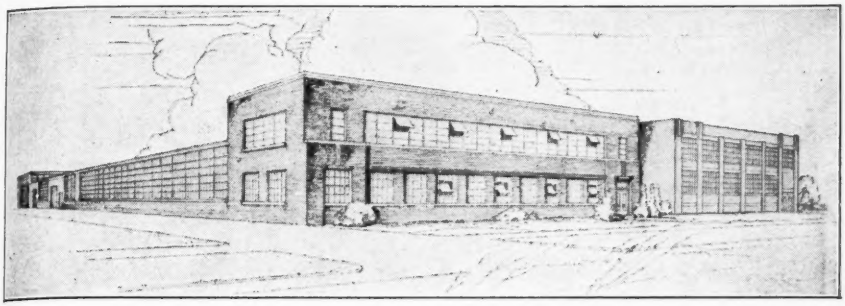
International Nickel Expands Technical Service Staff

Mr. A. J. Wadhams, vice-president in charge of development and research, The International Nickel Company, Inc., 67 Wall St., New York, N. Y., has announced the appointment of Mr. Wayne Z. Friend to the development and research staff. Mr. Friend will devote most of his time to technical service on corrosion resisting materials, particularly Monel, nickel and Inconel.

After graduation from West Virginia University in 1926 with a Master's degree in chemical engineering, Mr. Friend engaged in the production and marketing of natural gasoline with Gasoline Recovery Corporation, Charleston, W. Va. During the past seven years he has been associated with Phillips Petroleum Company and as chief technologist of Philgas department of that company in Detroit, Mich. He has been active on committees of the American Gas Association, National Bottled Gas Association and American Society for Testing Materials.

Manufacturers and Fabricators, Inc., Organized

A highly specialized organization, known as manufacturers and fabricators, Inc., has been recently formed for



New Detroit Rex Manufacturing Building

the manufacture and fabrication of iron and steel products. The plant is to be located at 4389 Martin Avenue, Cleveland, Ohio. Mr. Schilling, mechanical engineer, furnace designer, and manufacturer of industrial furnaces, has been elected president of this new organization.

Detroit Rex Products Company Occupies New Building

The completion of a large, modern manufacturing building with approximately 30,000 sq. ft. of floor space has been announced by Detroit Rex Products Company, 13017 Hillview Ave., Detroit, Michigan. The increased demand for solvent degreasing machines and degreasing solvents has made this expansion program necessary, according to R. A. Emmett, president. This is the second time within the period of a year that manufacturing facilities have been enlarged to meet the increased demand for this company's products.

The building is constructed of steel frame with face brick set to emphasize the horizontal detail which adds distinction to the modern design of the building. At the same time, the plant conforms in general to the present building to which it is joined by a second floor bridge. Engineering offices and drafting rooms are located on the second floor; while research and physical laboratories, as well as shop offices, are located on the first floor. The plant proper has a 40 ft. center aisle, with 24 ft. clearances, in which a 10 ton traveling crane operates, and two 30 ft. wide aisles each with 16. ft. clearances.

The building is entirely constructed of fire-proof materials, having a floor of steel trowelled concrete, surface with a metallic hardness, and an insulated metal roof deck which has been welded to the steel joist purlins. These are in turn welded to the structural steel framework of the building.

The project includes installation of tracks alongside the plant for a special railroad siding which extends through the end bay of the building. A power plant of modern design has been incorporated in a special building adjoining the plant. The entire project represents an investment of approximately $100,000, exclusive of equipment.

American Rolling Mill Company Announces Appointments of Assistant Vice Presidents

G. F. Ahlbrandt and W. W. Lewis have been appointed as assistant vice presidents of The American Rolling Mill Company, Middletown, Ohio, and H. M. Richards has been appointed manager of the Sheet and Strip Sales Division in several important changes in the Armco Sales Division announced today by W. W. Sebald, vice president in charge of commercial activities for the company. These changes are due to the company's enlarged business, the announcement said.

These veteran Armco executives have had broad experience covering many years on various phases of distribution in the iron and steel sheet industry.

Mr. Ahlbrandt joined the Armco organization in 1904 as an open hearth chemist. He later became assistant open hearth superintendent and in 1909 entered sales work for the company, ultimately becoming general manager of sales.

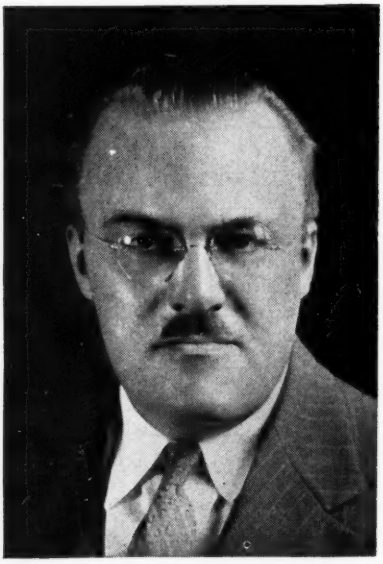
Mr. Lewis came to Armco in 1917 as assistant open hearth superintendent.

In 1922 he took up sales work and in 1925 was made manager of the London branch of Armco International Corporation. Returning to Armco sales headquarters in 1927, he was appointed assistant to the vice president in charge of commercial activities.

Mr. Richards joined Armco in 1913 as a clerk in the order department, later becoming assistant manager in that department. In 1916 he was made a salesman and in 1924 was appointed district manager of Armco's Cleveland, Ohio, office, where he remained until 1931, when he was appointed assistant general manager of sales.

Boenig to Harnischfeger Corporation

The Harnischfeger Corporation, 4535 W. National Ave., Milwaukee, Wis., has recently announced the appointment of Mr. C. H. Boenig, Youngstown, New York, as P&H sales engineer who will handle the entire line of Harnischfeger products applicable to the finishing department; namely, truck cranes, overhead cranes, and electric hoists. Mr. Boenig will cover the entire western section of New York, including the city of Buffalo with Rochester, New York, as the eastern boundary line.



Mr. C. H. Boenig

With a technical education and past business connections that make him a recognized authority in the industrial field, Mr. Boenig holds a M. E. degree from Columbia University, a C. E. degree and Ph.D. degree from the University of Antwerp, Belgium, and also an LL.B. degree from St. Lawrence University.

Supplementing this educational experience, Mr. Boenig has had wide experience in work closely connected with that of his new position. His past connections include vice-presidentship of the Ball, Bear and Machine Company, general manager of the Malka Water Company, industrial engineer in charge of the Philadelphia office of the United States Fidelity and Guarantee Company. Augmenting this he was connected with the United States government in the Department of the Interior for five years as supervisory engineer.

Commercial Solvents Now Serving Industrial Alcohol Customers of American Distilling Company

According to a recent announcement made by William D. Ticknor, president of Commercial Solvents Corp., 230 Park Ave., New York, N. Y., The American Distilling Company and its affiliate has turned over to Commercial Solvents the entire industrial alcohol business, including good will, permits, and that part of their sales force specializing in industrial alcohol.

National Paint, Varnish and Lacquer Association to Hold Annual Convention October 27 to 29

The National Paint, Varnish and Lacquer Association will hold its annual convention at the Hotel Netherland Plaza, Cincinnati, Ohio, October 27 to 29. Ernest T. Trigg, president of the National Association, has authorized an "Open House" invitation to the entire paint, varnish and lacquer industry to attend the convention, including nonmembers as well as members of the Association. Mr. Edward A. Foy, Jr., president of the Cincinnati branch, is chairman of the entertainment committee for this annual covention.

Houghton Celebrates 25th Anniversary at Metals Exposition

By means of graphic displays of its entire line of heat-treating salts at the

Metals Exposition at Atlantic City, E. F. Houghton & Co., 240 W. Somerset St., Philadelphia, Pa., will celebrate the inception of its heat-treating salt business 25 years ago.

Revealing the outcome of extensive field tests over the past two years, Houghton officials, metallurgists, and members of the Metal Research staff will discuss publicly for the first time the company's new and comprehensive line of heat-treating salts. This includes some 19 formulae, of which 8 are recent developments.

Interesting case histories and performance records of the new salts will be given. The company's complete line of carburizing, neutral hardening, reheating, annealing, drawing, and high-speed steel treating salts will be visually portrayed as to working ranges and uses.

In addition, there will be individual exhibits of the company's various straight and soluble cutting oils, inhibitors, solid carburizers, metal cleaners, rust preventives, and lubricants.

General Electric Stresses Heating and Welding at National Metal Exposition

In cooperation with the Jacobs Manufacturing Co., Hartford, Conn., General Electric Co., Schenectady, N. Y., will exhibit complete electric furnace equipment for scale-free hardening and drawing of drill-chuck sleeves at the National Metal Exposition. The equipment which will be in actual operation is a duplicate of that used by the Jacobs Manufacturing Co. and includes a scale-free hardening furnace, a drawing furnace and degreasing equipment.

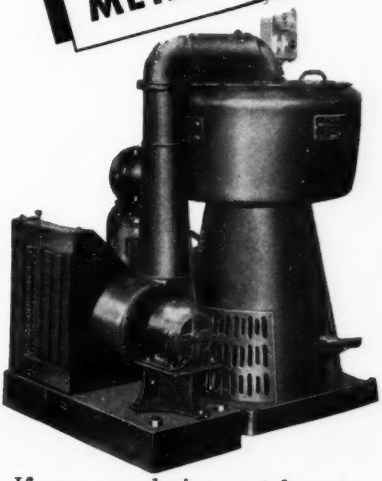
In addition to electric furnace equipment, General Electric will demonstrate the latest types of arc welding apparatus including the new G-E Mutator (d-c) arc welder for use with light gauge metals, and new single-operator (d-c) sets, which will include both motor generator combinations and gasoline engine driven equipments. A complete line of G-E arc welding accessories will also be on display. Modern industrial X-ray equipment will be shown by the General Electric X-Ray Corporation.

New Department Created at Ferro

Ferro Enamel Corporation, 4150 East 56th St., Cleveland, Ohio, has announced that effective October 1, a new central purchasing department will be created Mr. D. D. MacBeth will be in charge of the department as purchasing agent.

DO IT CENTRIFUGALLY IT'S FASTER .... BETTER!

WASHING AND DRYING METAL PARTS



If you are drying metal parts with sawdust, consider: TOLHURST METAL DRYERS dry 20 to 30 loads an hour — ten times faster than sawdust method. More, Tolhurst Metal Dryers impart a better finish, eliminate spotting, tarnish or oxidization. Fire hazards are banished. Costs cut. Request full details.

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They're coming from everywhere . . . . from every state in the nation where metal is produced or fabricated . . . . and from other countries, too.

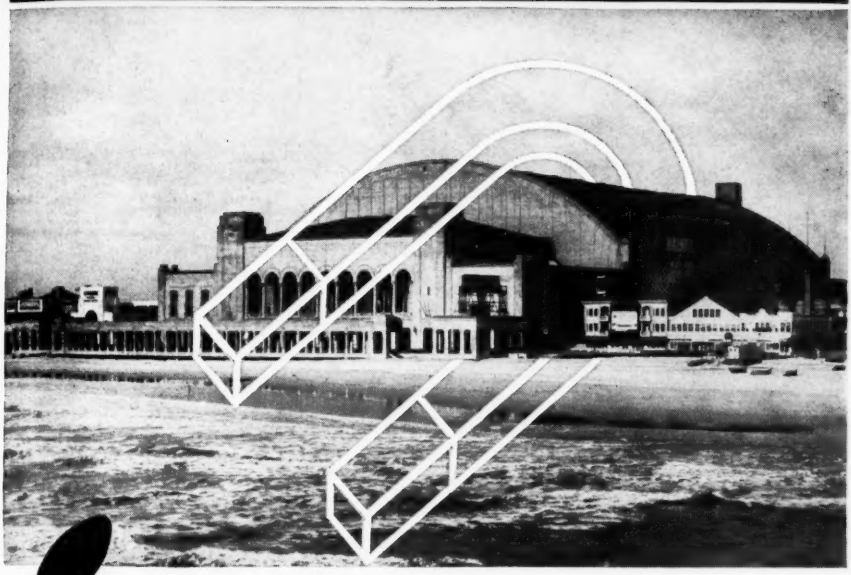
If you have a metal problem—bring it with you to the National Metal Congress and Exposition in Atlantic City, October 18-22. During the five-day Congress you will be able to discuss it with outstanding metal authorities—men who know the latest word in answer to the problems met in the manufacture, treatment, fabrication, testing and inspection of metal.

More people than ever before will attend the 1937 Show and Congress at Atlantic City. They will return this year with new questions because they know that every Metal Show is packed with worthwhile ideas and helpful information.

For complete program, address American Society for Metals, 7016 Euclid Avenue, Cleveland, Ohio.

For hotel reservations, write to William B. Coleman, Chairman, Committee on Hotels, 16 Central Pier, Atlantic City, New Jersey.

# of METALS . . .



More than 225 carefully prepared exhibits of leading industrial organizations.

More than 145 authoritative up-to-the-minute technical papers.

More than 10,000 of your fellow metal men in attendance.

5 days rich with opportunity for education, relaxation and stimulating contacts . . . . an opportunity to refill the think-tank with brand-new, high power energy.

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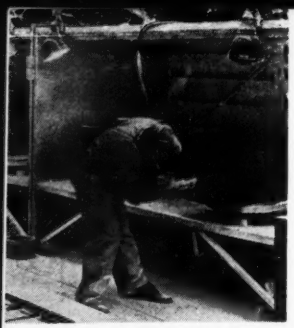
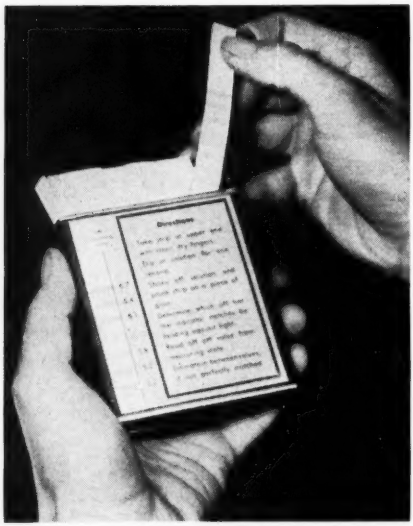


NEW
Plant Equipment & Materials

Udylite pH Indicator Papers

A method of determining the pH of plating solutions at the tank in as little as 5 seconds time has just been announced by The Udylite Company, 1651 E. Grand Blvd., Detroit, Michigan. pH Indicator Papers used for this purpose are graded for pH range and require no technical knowledge to read or understand. These papers consist of strips of special paper, impregnated with a highly



Udylite pH Papers are packed 200 in a box and can be conveniently carried in the pocket.

sensitized indicator and a scale of color bars, each bar being of a different color and having a definite pH value. When the strip is dipped into a solution, the indicator will change color. By comparing the color of the indicator with the colors of the color bars, the pH value of the solution can be ascertained.

In use, a test paper of the desired pH range is selected, dipped for a second in the solution, held to the light and the correct pH reading is instantly obtainable by color comparison. pH papers are also adaptable for determining the pH of alkaline cleaners, a method favored to maintain maximum cleaning efficiency. Cleaners are compounded together to give the desired pH and such emulsifying agents are employed which reach the maximum efficiency within the predetermined pH range.

It is stated by the manufacturer that tests conducted by outstanding electrochemists prove pH papers to be very accurate. It was found that pH papers compare very favorably with the quinhydrone electrode in accuracy and are as accurate as the colorimeter or comparator. Close comparison with the quinhydrone electrode gives convincing proof of the accuracy of pH papers, since the quinhydrone electrode is generally accepted as a very accurate method of determining pH.

pH Indicator Papers come packed 200 papers in a box, and can be carried in the pocket or kept in a convenient place near the plating solutions ready for instant use. It is also stated that pH papers do not deteriorate or lose effectiveness in giving correct pH readings over long periods of intermittent use. Udylite pH papers are available in 7 pH ranges from pH 0.9 (strongly acid) to pH 13.5 (strongly alkaline).

Maas and Waldstein Dielectric Enamel

A black enamel, with special dielectric properties, has been placed on the market by Maas and Waldstein Company, Newark, N. J. This dielectric enamel is especially suitable for finishing electrical apparatus, such as steel switchboards and instrument panels, coils, and radio bases. It dries to a rubber finish, is tough, durable, and has high electrical resistance, according to the manufacturer. It can be applied by spraying, and a switchboard panel that has been marred or defaced can be easily refin-

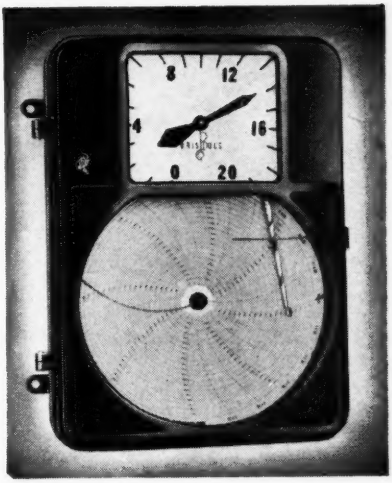
ished without dismantling by spraying on an additional coat.

A surfacer, with similar dielectric properties, is also supplied for preparing the surface to be finished with the enamel.

Bristol Round-Chart Potentiometer Pyrometer with Dial Indicator

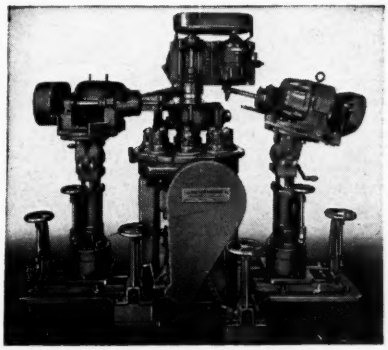
The potentiometer pyrometer, shown in the illustration, has been recently developed by The Bristol Company, Waterbury, Conn., for recording and indicating thermocouple temperatures. Bristol's Indicating Recording Pyromaster, the name applied to the instrument, provides for direct marking on a 12 in. round-chart and scale indication on a large dial. It employs the potentiometer method of measuring electromotive force in terms of temperature, using standard thermocouple and extension leads, but it operates on a new and simplified principle.

The new instrument is said to be exceedingly rugged and not effected by excessive vibration. There is no mechanical motion of any kind except when a change in temperature occurs.



Bristol Round-Chart Potentiometer Pyrometer with Dial Indicator

The operation mechanism is simple and compact, consisting of a highly damp-



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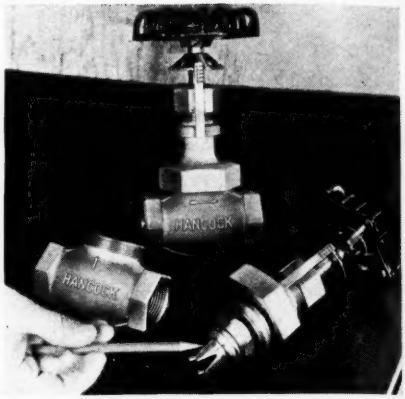
ened sensitive Galvanometer, ruggedly pivoted in jewel bearings, a special relay unit, actuated by the galvanometer to operate the motor that balances the pen arm and scale indicator, a standardizing unit, a "Power Pack" and the potentiometer or recording and indicating units.

The pen arm or indicator is actuated through the relay switches in small steps, at a rate depending on the rate of change in temperature at the thermocouple. No lubrication is required. The cold-junction compensator is fully automatic. No manual adjustments are necessary. The extreme simplicity of the operating mechanism makes it possible to house the instrument in a standard Bristol's case.

Bristol's Pyromaster is available as a recorder, indicator, recorder with indicating scale, recorder controller, and as a recorder controller with indicating scale. Controllers are of either pneumatic or electric type.

Hancock Flocontrol Valves

The Hancock Valve Division of Manning, Maxwell & Moore, Inc., Bridgeport, Conn., has announced a redesigned line of Hancock Bronze Flocontrol Valves.



Hancock Flocontrol Valves

These valves are said to be a combination flow instrument and shut-off valve.

The line of Flocontrol Valves retains the basic proportional flow or straight-line flow characteristics of the original valves. The manufacturer states that its pioneering with super-hard stainless steel valve seats and discs of 500 Brinell hardness has been successful and that the Flocontrol line now contains this wear resisting feature. The seats and discs of the Hancock valves are so hard that diamond boring machines are required in their manufacture. These hard valve seats and discs are said to smash nails, pipe turnings, welding chips and boiler scale without leaving a trace on either seat or disc.

The Flocontrol Valves are equipped with the Union Bonnet type of body. These valves can be used for the proportional blending of mixtures, on mixing machines and moisture or vacuum control.

Beugler Mechanical Striper

Striping on the curved surfaces of moldings is said to be facilitated by an adjustable "swivel-acting" wheel head of the Beugler Mechanical Striper which is being marketed by Beugler Manufacturing Co., 4318 W. Second St., Los Angeles, Calif. The striping wheel and axle are both of standard steel, thus insuring long wearing surface and true action.

Elimination of dripping is said to be accomplished with an improved design whereby the natural movement of the striping wheel causes all surplus ma-

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and forget your buff worries.

Best for buffing Stainless Steel.

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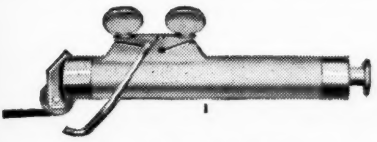
terial to be drawn back automatically into the barrel and remixed, even when the striper is used in difficult positions. An additional feature is that the wheel



Beugler Mechanical Striper

head is provided with an extension for striping with straight edge of templet if desired. The striping material is held in contact with the wheel by a movable plunger, thus permitting striping in all positions.

The Beugler Striper is designed for easy cleaning, requiring only one minute for a complete change of color. It is made to operate with any standard striping material. Wheels are furnished for making all stripes from 1/64 to ¼ in. width. An assortment of adjustable guides makes possible perfect striping for practically any type of work. It is stated by the manufacturer that the Beugler tool can be used by an unskilled striper after a minimum time of practice.

General Electric Vapor Lamp Announces Modernized Series of Long-Tube Mercury Lamps

A modernized series of mercury lighting units of the long tube, Cooper-Hewitt type—improved in lighting efficiency, operating stability and appearance—is now being introduced by the General Electric Vapor Lamp Company, Hoboken, N. J. The new "50-in. light source" operates at 350 watts A.C. to supply the same light output which required 450 watts in previous models, its bare-lamp efficiency being 19.4 lumens per watt. The new "33-in. light source" operates at 280 watts in contrast to a previous 350, with an efficiency of 17.1 lumens per watt.

As equipped with newly designed enameled reflectors, the complete lighting units have an overall efficiency of about 15 lumens per watt, exceeding almost every other lamp-and-reflector combination. Both the reflector and tube are now intended for mounting in a true horizontal position. Starting, and restarting after any current operation, is instantaneous. The entire unit has been redesigned to simplify maintenance and make cleaning easy. All tube connections are made with insulated screw terminals.

In contrast to more concentrated "bulb type" light sources, this type of mercury tube is said to have the inherent advantages of large light-source area and low unit brightness, without the use of light-absorbing diffusing glass. Thus it is particularly suitable for precise seeing tasks requiring a minimum of shadow and glare and a maximum of detail-revealing clarity. Major applications include metal working, manufacture of fine machine parts, machine assembly, textile manufacture, printing, and industrial inspection.

Light from the new units has the same cool, spectral characteristics as from former Cooper Hewitt lamps—high in visual effectiveness where color recognition is not a factor. In addition, a "skylight" unit combining the new long-tube light source with incandescent lamps is now offered for use where a close approach to daylight color values is required.

The higher light efficiency of the new lamps results from a new regulating

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The Varnish Products Co.

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circuit, equipped with a special Pyranol capacitator. Power factor is 90 per cent for the 50-in. light source, and 85 per cent for the 33-in. unit. A unique characteristic of this new circuit is the

G. E. Vapor Lamp Co. Long-Tube Mercury Lighting Unit

fact that the starting current shows almost no initial surge above the operating level—an important factor from the standpoint of wiring and switch capacity.

Instant starting and added dependability have been obtained by substituting a new vacuum type interrupting switch in place of the "shifter" formerly used for starting the mercury arc within the tube.

Hilo Elastic Lacquer in Colors

An elastic lacquer in colors that covers in one coat and can be applied by machine has been brought out by the Hilo Varnish Corporation, 42-60 Stewart Ave., Brooklyn, N. Y. Hilo Elastic Lacquer is also said to bake quickly and is not effected by stamping oils. It is also said to be so elastic that strip steel coated with it can be stamped and cut into such items as buttons and caps after a period of a year or more after coating.

Low Temperature Black Finish for Steel

A coloring bath known as "Penetrate Black" is said to provide the means of applying an attractive black finish to steel parts and tools at temperatures as low as 310 deg. F. at the plant of Lindberg Steel Treating Co., Chicago, Ill. The process is controlled by Heat-Bath Corp., Springfield, Mass. The blackening process is applicable to practically all steels with the exception of the high chromium stainless types.

With Penetrate Black, hardened tools such as drills, taps, and reamers can be given a black finish without loss of hardness. The finish is a lustrous black and is said to have considerable resistance to atmospheric corrosion, which

Naphtha and Brushing Eliminated!

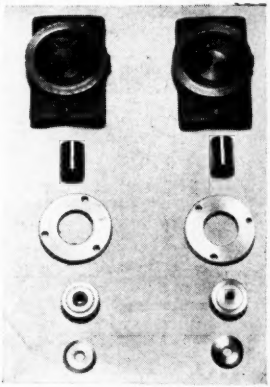
A large tool and equipment manufacturer was using naphtha to remove cutting oil and chips from cast iron and steel parts.

These parts are now cleaned with MAGNUS No. 78 (a new product), then simply rinsed. Not only is the dangerous fire hazard eliminated and better cleaning results obtained—but the labor of brushing the cast iron parts, is likewise done away with. Another feature is the fact that the cleaner is used at room temperature, eliminating all need of heating for the cleaning operation.

Metal working manufacturers everywhere are looking into the many favorable features of MAGNUS No. 78, the new emulsion degreasing liquid for the cold cleaning of metals. It combines solvent degreasing with soap washing, giving results that are better than either alone.

SEND FOR THIS DATA

Write today for full details about MAGNUS No. 78 for precleaning. Or, without obligation, we'll gladly send you a drum of this material on trial. Our money-back 30-day guarantee fully covers you.



An unretouched photo showing parts before and after cleaning with MAGNUS No. 78.

MAGNUS CHEMICAL COMPANY

208 South Avenue Garwood, N. J.

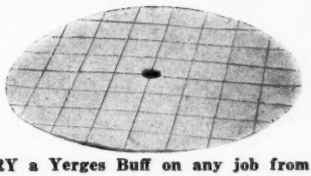
MAGNUS CLEANERS

makes possible the storage of treated parts without additional protection against rusting. Parts which have been case-hardened in cyanide baths can be given a black finish without loss of surface hardness. This type of finish has been found satisfactory for die casting dies, for zinc, or for aluminum base alloys to prevent sticking or soldering when placing a new die in service.

Despatch Oven

Despatch Oven Co., 622 Ninth St., S. E., Minneapolis, Minn., has introduced an unusual heat distributing, air circulating and recirculating system into the design of a unique oven which is used to bake all types of finishes on air conditioning units. Despatch engineers were confronted by a loading problem which required large sheets to be hung vertically at one time and laid horizontally at other times, thus they arranged this oven with a Dual heat distributing air circulating and recirculating system.

When the sheets are hung vertically, the heat is introduced at the bottom and passes vertically upward through the sheets, causing the finish on each one to be baked evenly and quickly.



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No. 3321 Rack Truck—Frame, 33" wide by 21" deep by 60" high. Top and bottom shelves stationary. Furnished with one to eighteen adjustable intermediate shelves. Wood or steel shelves optional. Rigid steel frame mounted on casters. Green finish—shipped set up.

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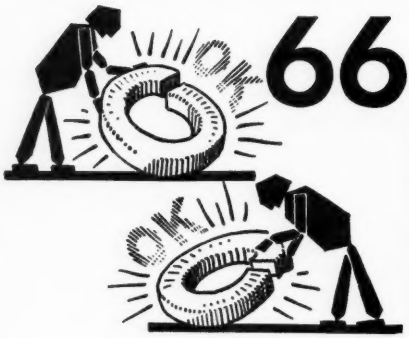
No. 3321 RACK TRUCK

METSO 66



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"WE'RE getting rejects on our cleaning" said a lock washer manufacturer. "Can Metso help us?"

With its almost flash action, Metso 66 removed every trace of oil and scale. The correctly proportioned silicate content of "66" prevented dirt from redepositing on the washers.

Are you looking for improved soaker tank or electro cleaning? Try Metso 66.

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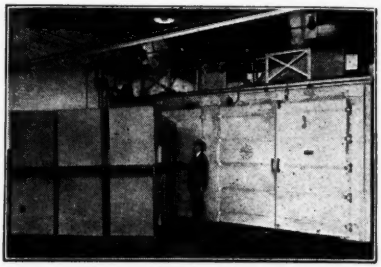
METSO CLEANERS

U. S. Pats. 1898707 and 1948730

When the sheets are laid horizontally, a simple adjustment causes the heated air to pass from side to side between the sheets and again fast even baking is obtained.

In conjunction with this oven system, an externally mounted direct gas heating system with a large capacity fan for forcing heated air into the oven ducts is used. There are numerous recirculating air changes in the oven and



Despatch Oven

in addition there is sufficient exhaust to remove volatile fumes as quickly as formed.

Ovens of this type are recommended in cases where a variety of parts do not permit easy flow of air around the surfaces under all loading conditions. The oven illustrated herewith is applicable to all types of batch ovens as well as conveyor ovens.

Detroit Rex Vapor-Spray-Vapor Degreaser

The line of standard and special degreasing machines manufactured by Detroit Rex Products Company, 13017 Hillview Ave., Detroit, Mich., has been augmented by the completely automatic degreaser shown in the illustration. This unit can be used for the cleaning of miscellaneous metal stampings.

This unit is a special vapor-spray-vapor machine and is equipped with a two-strand, cross-rod type conveyor arranged for loading and unloading at the same end. The work is placed in perforated baskets which are hung from the cross-rods of the conveyor. In passing through the degreaser, work is lowered into the hot solvent vapors which thoroughly wet the work and remove part of the heavy contamination.

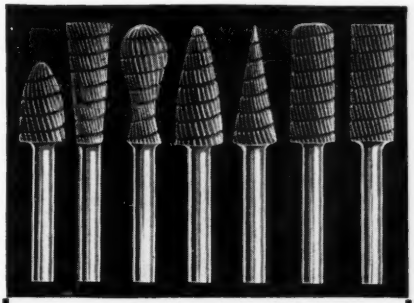
As the conveyor moves horizontally along the machine beneath the water

jacket condenser, clean warm solvent is pressure-sprayed onto the work from banks of spray nozzles. This mechanical action is said to forcibly remove and drive off solids. A final cleaning in pure solvent vapors insures complete removal of oil and grease. Returning back overhead to the loading and unloading stations, the work emerges clean, warm, and dry, ready for subsequent finishing operations.

Steam coils are located in a boiler sump and in the clean solvent distillate collecting sump which is located at the right end of the machine, as shown in the illustration. Galvanized steam coils are welded to the removable clean-out doors.

A vapor-actuated, air-operated control system, consisting of thermostat temperature indicator and valve, is used to regulate the heat input, control the height of the vapor column, and insure maximum operating economy. A self-actuated valve in the steam line which heats the clean solvent distillate also controls the temperature of the hot solvent used for spraying.

A water jacket condenser and a solvent collecting trough encircles the machine. The collection trough is arranged so that clean distillate can be made to



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1/3 H.P. BALL BEARING MOTOR
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A.C. 110 volt, 60 cycle, single phase.
8"x10" table mounted on swivel sockets adjustable to 50° in any direction.

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● Here's a Disc Grinder that was specially designed to save you time and money on small part grinding — wood patterns, small metal castings, glass edges, etc. Write for further details.

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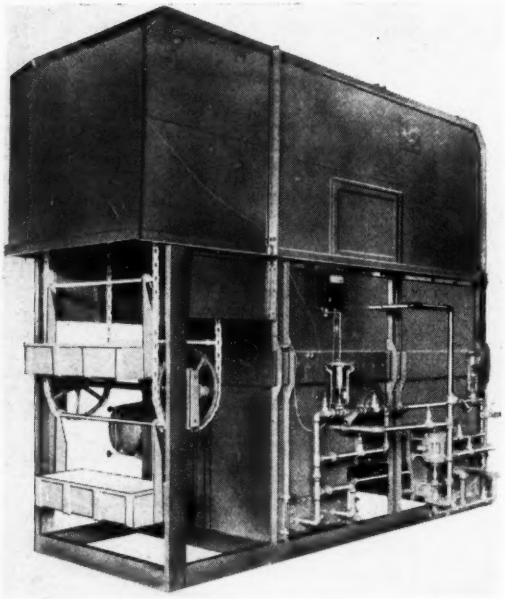

Automatic Detrex Degreaser for use in cleaning miscellaneous stampings and metal parts prior to finishing or heat treating.

flow into the spray sump at the right end of the degreaser or into the clean solvent storage tank at the back of the machine. The solvent that drains from the work, as well as the overflow from the clean solvent spray sump, flows back into the boiling sump.

The clean solvent storage tank is of sufficient capacity to hold all of the solvent of the machine during the distilling operation. In this way, the contamination is removed and the solvent reclaimed for further use by distillation within the machine itself.

The rated production cleaning capacity of the degreaser shown in the illustration is approximately 3,000 lbs. of work per hour and a conveyor speed of 6 ft. per minute. The conveyor speeds can be increased to 12 ft., thus cleaning 6,000 lbs. per hour. The overall dimensions of this unit are 13 ft. long, 7 ft. wide, and 11 ft. high. The solvent capacity is 120 gallons.

Hydro-Heaters

A heater which is said to provide hot water at a controlled temperature, to be known as "Hydro-Heater", has been placed on the market by the Hydro-Heater Corporation, 1819 W. St. Paul Ave., Milwaukee, Wis. The Hydro-Heater is in effect a steam and water mixing valve, which injects steam into a stream of cold water to produce a uniform flow of hot water at a constant temperature. It is said to operate without the aid of any thermostat or acces-

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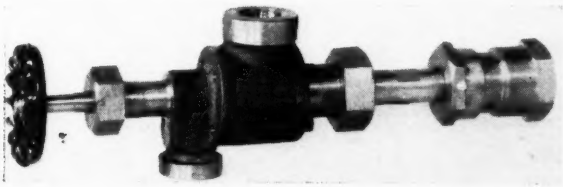
40 STATION STREET • SOUTHPORT, CONN.

sory controlling device. A full flow of hot water is available at the desired temperature as soon as the steam and cold water are turned on at the Hydro-Heater.

When hot water itself is used in cleaning, a tank can be filled by running the cold water supply through the Hydro-Heater and the hot water will discharge into the tank. It takes no longer to fill the tank with hot water than it does with cold. After the tank is full, the supply line valve can be closed and the valve in the suction line opened; thus, the water in the tank is recirculated through the heater to maintain the desired temperature. The Hydro-Heater ratio of steam and cold water is said to deliver heating coil water at the desired temperature which can be maintained as long as desired.

The requirements for the Hydro-Heater are steam at a constant pressure which is usually available in most industrial plants and cold water at uniform pressure and temperature. There are two Hydro-Heater units available—a low pressure and high pressure. The high pressure heater operates with a steam pressure up to 150 lbs. and will

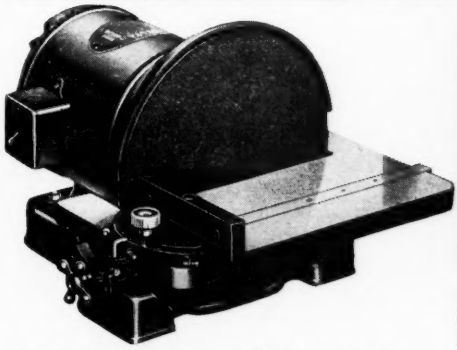


Hydro-Heater

give a delivery pressure within 15 lbs. of the steam pressure.

The low pressure heater will operate with the steam down to atmospheric pressure at the heater and will give a delivery pressure of 48 lbs. when the delivery temperature is 100 deg. F. The delivery pressure will be progressively less as the delivery temperature is raised with a maximum temperature of about 100 deg. F.

Expert workmanship in the manufacture of each Hydro-Heater assures satisfactory operation of each unit.



NEW 12" DISK SANDER

For Finishing, Squaring, Plain or Compound Mitering, Fitting and Grinding on Wood, Metal, Bone, Plastics and many other materials, this new disk sander offers unusual accuracy, dependability and convenience.

Not merely another sander, this quality tool is designed to meet every requirement for ACCURATE convenient sanding. From its specially machined, true-running 12" disk to its unusually large tilting table, its husky spindle carried on self-sealed ball bearings, this latest Delta tool is built for long life, low power consumption, accurate dependable results and maximum convenience in operation. Available in two models: *Direct-drive*, using the Delta ½ h.p. motor with disk fitted directly onto the motor shaft; *Belt-drive*, for those who wish to use their own motors. Write for name of nearest Delta dealer and full details and prices.

DELTA MFG. CO.

615 E. Vienna Ave.
Milwaukee, Wis.

Thwing-Albert Portable pH Meter

The Thwing-Albert Portable pH Meter, which has been placed on the market by Thwing-Albert Instrument Co., 3339 Lancaster Ave., Philadelphia, Pa., is designed primarily for use with "Reference" and "Measuring" electrodes, of the same type. The two types most generally used are the quinhydrone and antimony electrodes. The quinhydrone electrodes come to equilibrium quickly and are well within the accuracy of the instrument but are limited to the range 0 to 8.5 pH. The antimony electrodes are a little slower approaching equilibrium and in the range above 7 pH are likely to vary from the true pH by as much as 0.1. They do, however, give reproducible readings, and are good over the range 2 to 12 pH.

Thwing-Albert Portable pH Meter

The Thwing-Albert Portable pH Meters are especially suitable in making pH determinations in the plating industry. Directions for using the Thwing-Albert Portable pH Meters are contained with each instrument.

Sterilkote

A baking synthetic coating for metals, to be known as "Sterilkote", has been brought out by the Bradley & Vrooman Co., 2630 S. Dearborn St., Chicago, Ill. According to the manufacturers, Sterilkote is sufficiently adherent and elastic to permit bending, stamping, and drawing operations without cracking or marring the finish. It is obtainable in clear and a variety of attractive colors, which develop into hard, glossy coats.

Sterilkote can be applied by spraying or roller coating and baked at various temperatures and baking times according to the specific requirements of the job. It is recommended particularly for lining beverage and food containers, due to its non-toxic, odorless, tasteless, and non-porous qualities. While primarily designed as a liner, the new finish is

Faster Work **THE BIAS BUFF** *Longer Life*

—is used by the major industries of America. There is from 25% to 50% more wear in a **BIAS** buff than in the common type. **BIAS** buffs never ravel, because they are made of sheeting **cut** into bias strips, hence every thread in each ply comes in positive contact with the work; and wears with efficiency, down to the last ounce of cloth. Try a **BIAS** Buff, let us prove these statements.

BIAS BUFF & WHEEL CO., INC.

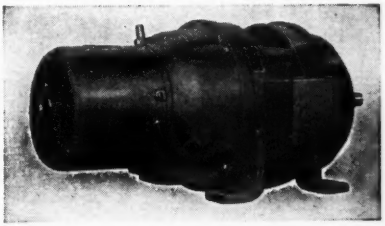
430 Communipaw Ave. **Jersey City, N. J.**

also recommended for metal surfaces that are subjected to extremes in exposure and hard usage, such as washing machine lids, special types of dispensing cabinets, laboratory equipment, and a host of other fabricated units.

"Disc-Brake" Motors Have Built-in Brakes

A new power unit to be known as the "disc-brake" motor has been made available by The Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland, Ohio. The motor combines, in a single unit, the functions of a motor with those of a powerful brake, and is useful for small cranes, hoists, auxiliary movements on machine tools and other equipment in which quick, automatic and accurate stopping or the holding of a load is necessary. It is stated that with these disc-brake motors it is often possible to connect the drive direct and thus avoid the need for clutches. Reliance motors of any operating characteristics, both D.C. and A.C., may be specified to meet any particular case.

The brake itself consists of a simple and compact disc-type friction device, mechanically and automatically engaged when the current is shut off and magnetically disengaged when current



Reliance "Disc-Brake" Motor, (A. C. Squirrel-Cage Type.)

is applied. The friction lining is supported on a square steel hub which is keyed to the motor shaft. A "wear-indicator," combined with the manual brake release mechanism, gives warning whenever wear needs to be taken up. This setting, however, is separate from the torque adjustment, so that either may be adjusted independently. Varying

pH PAPERS
NEW METHOD
FOR DETERMINING pH VALUES OF ACID OR ALKALINE SOLUTIONS

SIMPLE—CONVENIENT—DEPENDABLE—QUICK—NO APPARATUS—RESULTS IN FEW SECONDS

Just dip strip of pH paper in solution and read off pH value. Can be carried in pocket. Always handy.

PRINCIPAL RANGES: (also others from 0.9—3.4 pH.)

No. I.	5.2— 6.7	for nickel
No. II.	3.6— 5.0	for nickel (hot)
No. VI.	9.5—11.0	for brass, cyanide of copper and silver
No. VII.	11.0—13.5	for cadmium, bronze, zinc, and alkaline cleaners.

PAUL FRANK

SOLE IMPORTER

456 Fourth Ave. New York

Tel. MU. 4-4765

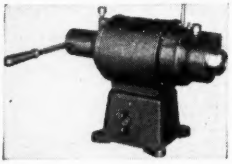
braking power, from maximum to 50 per cent of maximum, may thus be obtained as needed.

The brake mechanism operates equally well in any position, and may be fitted to any standard Reliance motor except those of the fan-cooled type. All mounting dimensions conform to N.E.M.A. specifications so that standard brackets and bases may be used. The brake cover, which is entirely separate from the mechanism itself, may be readily removed by loosening four cover screws, thus making all parts easily accessible.

Koroseal Coated Paper

Protection for exposed surfaces of metal furniture as well as machinery which are likely to be attacked by salt air in ocean transit, is now being offered through a development by The B. F. Goodrich Co., Akron, Ohio, to be known as Koroseal Coated Paper. This paper is said to have a maximum resistance to acid, oil, air, and light. The unique properties of the paper, which is coated with a thin layer of Koroseal, a rubber-like substance that is said to be impervious to the common deteriorating agents, forecast a wide variety of uses.

IDEAL SPEED LATHES



FOR LAPPING
FINISHING
POLISHING
SMALL PARTS

2 Speed Motor. Automatic Brake. Collet or 3 Jaw Chucks. Hand operated or automatic. Write for Cir. 351.

SCHAUER MACHINE CO.
903 Broadway Cincinnati, Ohio

Paasche Baby Portable Electric Airpainting Unit

A recent development in the industrial finishing field, to be known as the "Paasche Baby Portable Electric Airpainting Unit," has been placed on the market by Paasche Airbrush Company, 1983 Diversey Parkway, Chicago, Ill. This unit is said to be ideal for maintenance work in small manufacturing plants, hotels, and schools, as well as automobile refinishing jobs.

The Baby Portable consists of a 1/6

METALPREP vs OTHER METAL CLEANERS

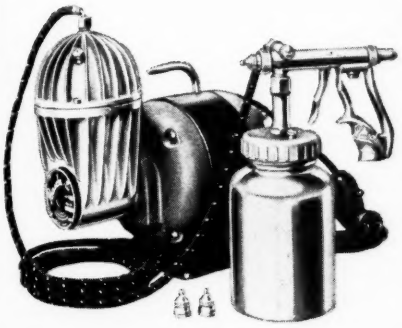
CLEANING

	Metal-Prep	Other Cleaners
REMOVES . . . oil, grease and difficult drawing compounds.	√	
DESTROYS . . . rust and rusting agents, such as soldering acids, handmarks, etc.	√	
NEUTRALIZES . . . alkali cleaners and caustic strippers, leaving the metal safe for paint.	√	
ETCHES . . . the metal, creating a tooth and firm bond for the paint finish.	√	
ELIMINATES . . . chipping, peeling and flaking of the finish coats, etc.	√	
NON-INFLAMMABLE . . . no fire hazard—non toxic—not injurious to health.	√	
MIXES . . . with water—low cost.	√	
SAFE . . . for the most "TOUCHY" finishes.	√	
ENDORSED and **RECOMMENDED** by leading paint manufacturers.	√	
PROVEN . . . for iron, steel, aluminum, aluminum alloys, galvanized iron, galvaneal, cadmium, terne-plate.	√	
TOTAL	10	

Write us for our bulletin "METAL CLEANING HINTS."

NEILSON CHEMICAL CO. Detroit, Mich. Windsor, Ont.

h.p. electric driven motor air compressor with airbrush, material cup and hose. While the unit is small enough to carry in an ordinary traveling bag, it is big



Paasche Baby Portable Electric Airpainting Unit

enough to use in painting automobiles, refrigerators, and household and office furniture.

GROBET

ROTARY FILES

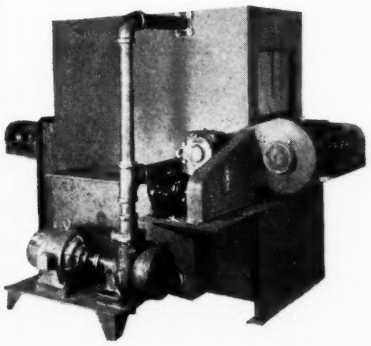
For Cleaning Castings, etc.

Ask for catalog PFR illustrating 200 different shapes. Also ask for catalog PFN illustrating our line of Swiss Precision Files. More than 4,500 shapes, sizes and cuts carried in New York stock.

GROBET FILE CORP. of AM.

3 PARK PLACE NEW YORK CITY

CUT TRUCKING COSTS



Cleaning machines placed in machining groups, eliminate trucking costs to central cleaning departments.

Whether it's small ball bearings or large engine block castings—whether it's oils, greases, chips or other foreign substances to be removed—HOBART offers the right equipment for the job.

Model 1218-C HOBART shown, can be furnished in any of several types and widths of conveyors.

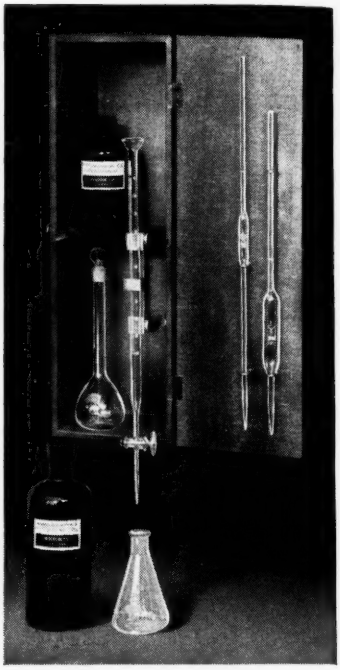
THE HOBART MFG. CO., TROY, O.

HOBART Washing Machines for every Industrial Cleaning Need

Kocour Analytical Sets

The Analytical Set for cadmium and zinc electroplating solutions illustrated herewith has been placed on the market by the Kocour Co., 4724 S. Christiana Ave., Chicago, Ill. This set enables anyone to rapidly determine the condition of a cyanide cadmium or zinc solution. It is well known that maximum efficiency is obtained only when solutions are maintained at proper concentrations of the various ingredients. Such factors as the time necessary to deposit a given thickness, the current density permissible, the non-porosity of the plate, and the appearance of the deposit are all dependent upon a balanced solution.

The set is said to be extremely easy to operate, the manufacturer having in mind that the average user knows little or no chemistry. Readings obtained from the set are the results sought; no involved calculations are required. All readings are in ounces per gallon of the various ingredients. Directions also include means of altering solutions should they be out of balance. The set consists of a well-made wall cabinet fitted with hardware to hold the necessary glassware during use and storage. The glassware is of the finest make, and the solutions are in handy bottles, which are well labeled. The solutions are concentrated so that very little is necessary in each test. The solutions do not deteriorate with age, thus correct results and economical operation are assured.



Kocour Analytical Sets

Keeping pace with modern manufacturing
STREAMLINED
DUST REMOVAL
SYSTEMS
..Have More Suction at Machines.
... for Grinding Polishing, Buffing Machines. Fume and Ventilating Systems
YOUNG AND BERTKE
HULBERT AVE. COMPANY CINCINNATI, O.

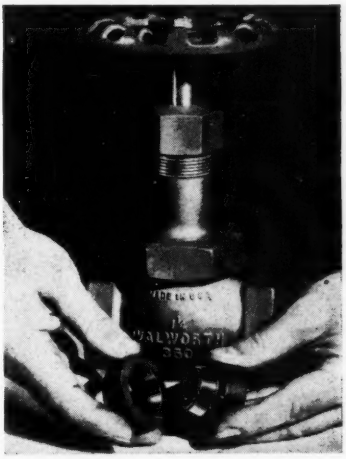
IMPERVIOUS FINISHES
PYROXYLIN LACQUERS, BAKING AND SYNTHETIC ENAMELS, FINISHING AND INSULATING VARNISHES, PROTECTIVE COATINGS, PRIMERS AND SURFACERS, ETC.
ENAMELS IMPERVIOUS TRADE MARK NCO PRODUCTS LACQUERS VARNISHES
FOR INDUSTRIAL USE
IMPERVIOUS VARNISH COMPANY
KOPPERS BUILDING, PITTSBURGH, PA.

Walworth Bronze Valve

A new bronze valve of exceptional service characteristics, employing a seat ring and disc of special stainless steel with a minimum of hardness of 500 Brinell, has just been introduced by the Walworth Company, 60 East 42nd St., New York, N. Y. The non-corrosive seat and disc are said to be hard enough to scratch glass and a nail can be flattened between them without leaving a mark at the points of contact. Thus in actual service, closing these valves on boiler scale or similar foreign particles, which are present in the line, will not damage them in any way. After tests involving more than 100,000 openings and closings, valves of this construction are still completely steam-tight.

Designed for general service on steam, air, oil, water and gas where conditions are exceptionally severe, these union bonnet valves may be had in globe and angle types, in sizes from ¼ in. to 2 in. Valve ratings are 350 lbs. W.S.P. and 550 deg. F. The modern design of these valves has also included extra large stems and extra long stem-thread contact, giving the advantage of greatly increased valve life, as well as minimum thread wear.

The malleable iron handwheel is a sure-grip, air-cooled, non-heating type



Walworth Bronze Valve

which is said to prevent burning of the hands. The seat ring and disc, because

NEW-BETTER
HOMMELAYA PROCESS
of
Vitreous Enameling

The greatest development in the Porcelain Enameling industry in the past century is here—proved—accepted.

1) **Produces a perfect Porcelain Enamel finish with only ONE coat and ONE fire!**
2) **Cuts enameling costs by one-third!**
3) **Reduces possible chipping to an absolute minimum!**
4) **Produces a BETTER finish in ONE coat than regular enamel in two coats!**
5) **Ware may be finished in any color desired!**

Write us TODAY and learn more about this NEW, BETTER, INEXPENSIVE method of Porcelain Enameling.

THE O. HOMMEL COMPANY
209 FOURTH AVENUE, PITTSBURGH, PA. • NEW YORK OFFICE
421 SEVENTH AVENUE • FACTORY, CARNEGIE, PENNSYLVANIA

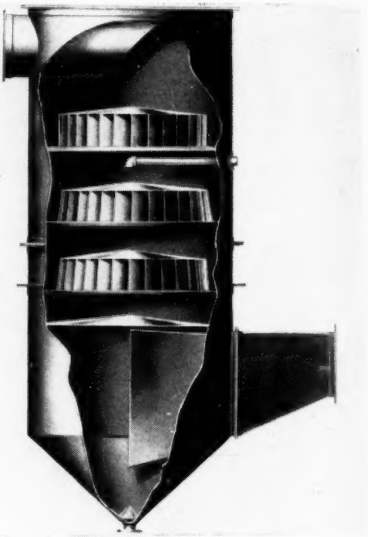
of their toughness and durability, will wear indefinitely and will not wire draw, steam cut or gall.

The union bonnet construction of the valve provides a tight joint which will stand a great deal of abuse. This construction is a marked advantage whenever dismounting of the valve is necessary for cleaning.

Schneible Junior Multi-Wash Dust Collector

The Claude B. Schneible Company, 3951 Lawrence Ave., Chicago, Ill., has placed on the market a Junior Multi-Wash Dust Collector. This is a new model and is said to possess the same major operating facilities as the Senior Multi-Wash Dust Collector except that dirty air, gases or fumes are scrubbed five times by an impingement principle arrangement instead of thirteen times as in the larger model.

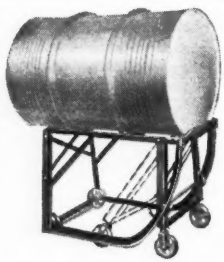
Dust and fume laden air is drawn into the bottom of the tower of the Junior Multi-Wash Dust Collector. Heavier particles are immediately deposited in the sludge cone. The air is drawn upward through a turbulent spray of water, passing over to sets of impingement plates in its ascent, which scrub the air, freeing it of the remainder of the dust, which is precipitated at the sludge cone at the bottom of the tower. Air is dewatered by an entrainment separator and discharged.



Schneible Junior Multi-Wash Dust Collector

Sludge in the cone is pumped to a Multi-Louver Dewatering Tank where the water is drawn off and recirculated. The manufacturer states that there are no moving parts, no dead zones, no nozzles or spray tips, and nothing to clog, freeze, adjust, lubricate or maintain. The Junior Multi-Wash Dust Col-

"NO-TARNISH"
#21 Brass #22 Silver #23 Copper
Durable clear finish for polished metals.
In use nationally for 20 years.
SPECIFY IF FOR OUTSIDE USE
Samples on Request
CLEAVELAND
LABORATORIES & MFG. CO., Inc.
447 Wilson Ave., Newark, N. J.


HANDLE HEAVY DRUMS EASILY
with MORSE Drum Cradle Trucks
Strong, easily handled and priced right. Front legs unlock to fold under body to allow tilting. Made of strong steel angle with rugged iron nose piece.
Write for Bulletin.
MORSE MFG. CO. SYRACUSE, NEW YORK

lector has been designed primarily for use in connection with spray booths, driers, and grinders, and innumerable places where it is desired to clean up a single operation.

A unique feature of the Junior Multi-Wash Dust Collector is that it can be readily converted into a Senior Model by inserting a single section in the tower containing additional impingement plates.

Rubber-Tired Wheels for Mathews Conveyors

The rubber-tired wheel shown in the illustration represents recently developed anti-friction products by the Mathews Conveyor Company, Ellwood City, Penn. Two types are available, identical in design, and differing in construction only in that one is larger and heavier than the other. These wheels are practical for many different applications. When mounted in light frames, they become an ideal conveying surface for shingles, steel sheets, glass, or any fragile object which must be protected from jarring or scratching. The sections are available straight or in any practical degree of curvature, with detachable or fixed couplings where portable or stationary conveyor sections are used.

Rubber-Tired Wheel for Mathews Conveyors

While it might seem that these wheels, due to the source of their development, are intended for conveying only, such is

TO THE MANY USERS OF IDING THE ORIGINAL POLISHING CEMENT

The SUCCESSOR to glue in wheels and belt polishing

We wish to express OUR THANKS for your valued patronage

This has enabled us to perfect our service to you as well as to improve our product to its present high standard of quality.

Prompt Service On All Orders

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BRANCH OFFICES AND WAREHOUSES

6432 Cass Ave., Detroit, Mich. 2329 Wilson Ave., Chicago, Ill.

328 Hansberry St., Philadelphia, Pa. 523 No. Bedford Drive, Beverly Hills, Calif.

DISTRIBUTORS: *THE LUSTRE CO., INC., St. Louis, Mo., SLIGO IRON STORE CO., St. Louis, Mo., THE PLATING PRODUCTS CO., Newark, N. J., REYNOLDS-ROBSON SUPPLY CO., Philadelphia, Pa., L. H. BUTCHER CO., San Francisco, Calif., CARL F. MILLER CO., Seattle, Wash.*

not the case. They could well be applied to casters for light dollies, small hand trucks, and portable cabinets; they would be practical for many other uses where a free-running, rubber-tired wheel is required.

The wheels are of pressed steel construction, having hardened steel inner and outer ball races. The smaller wheel, which is 2⅞ in. O. D., incorporates ten 3/16-in. diameter hardened steel balls and has a rated capacity of 20 lbs. The larger wheel which is 3½ in. O. D., incorporates eleven 5/16-in. hardened steel balls and has a rated capacity of 50 lbs. The latter wheel is of heavier construction throughout.

The rubber tire, which feature makes the wheel adaptable for many uses, is steamed into place. It contracts upon drying and fixes itself solidly on the wheel. As shown in the drawing, the inside of the tire fills the groove between the wheel flanges, holding the tire firmly in place.

The company has identified these wheels as Types 70-RT and 84-RT, the latter being of the heavier construction.

"Side-Arm" Electric Heaters

Electric heaters for oil, water, or other liquids, to be known as "Side-Arm" are being marketed by Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh, Pa. The Side-Arm heaters are especially designed for use as hot water circulator heaters for heating apparatus. Each unit can be furnished with a thermostat for automatic temperature control.

Side-Arm Electric Heaters are said to make good oil circulation pre-heaters. They can also be used as steam generators when mounted at a lower point with a closed steam system so that condensate keeps the heater elements covered. Insulated jackets can be furnished. The units are made in standard sizes rated from 1 kw. to 5 kw. inclusive, for 115, 230, or 440 volt service.

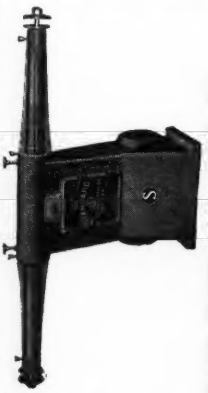
Unit Heater and Cooler "Grid Humidifier"

A humidifier for attachment either in front of or directly behind a unit heater, to be known as "Grid Humidifier," has been brought out by The Unit Heater & Cooler Co., Wausau, Wisconsin. To install the unit, no air lines or extra piping are necessary. A medium for humidifying purposes is immediately at hand in the unit heater. The operation of the humidifier is at temperatures higher than the room atmosphere, which causes quick and instantaneous absorption of the humidifying fluid or gas.

The Grid Humidifier may be operated with the unit heater or as an individual unit. Even though the fan of the unit is shut down, the humidifying action of the device continues to function until such time as desired conditions are reached in the room at which point the controls on the humidifier will shut it down.

Installation of the Grid Humidifier with unit heaters makes possible their

PROPER SPINDLE SPEED IS IMPORTANT!
You can obtain the PROPER spindle speed with—
STANDARD PROPER SPEED BUFFERS.
Motor inside or on rear of pedestal. V-belt Drive. 3 H. P. to 20 H. P. Multi-speed if required.
Also available with two motors inside the base. Individual spindle control.
Direct Motor Drive: ½ H. P. to 20 H. P.
WRITE FOR CATALOG
THE STANDARD ELECTRICAL TOOL CO.
1941 West Eighth St. CINCINNATI, OHIO
1912—25 Years Service to Industry—1937



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REBUILT
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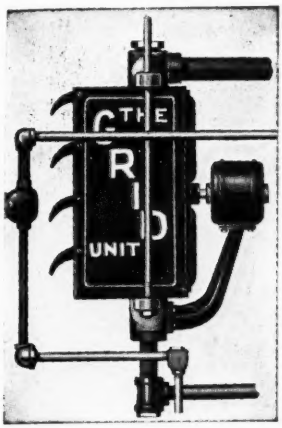
Will SAVE YOU Money
INQUIRIES SOLICITED
HARGY BUFF COMPANY
LOCKLAND OHIO

use in all kinds of manufacturing that requires variation in humidity condi-



Unit Heater and Cooler "Grid Humidifier"

tions due to special processes or manufacturing conditions.

Durtemp

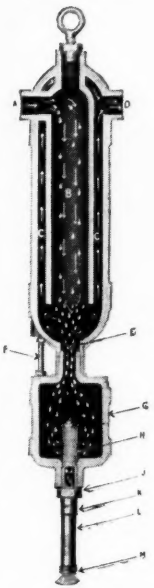
A new baking lacquer which is said to withstand the action of match flames, lighted cigars and cigarettes, perfumes, alcohol, and household chemicals, to be known as "Durtemp," has been brought out by Maas & Waldstein Company, 438 Riverside Ave., Newark, N. J.

Durtemp is a gold colored, clear lacquer, which is applied to metals by dipping or spraying and is then baked. It is being used for finishing ash trays, but is also useful for serving trays, vanity cases, and other products requiring protection from lighted cigarettes, spilled perfumes, and materials that are injurious to ordinary finishes.

Roura Dump Hopper

A new dump hopper, for use in connection with hand or power lift trucks, for handling raw materials, parts, waste or finished products, and designed especially for loads that are hot and for service in departments where the equipment is subjected to high heats, has been brought out by Roura Iron Works, Detroit, Michigan.

The hopper is arranged for side dump



ELIMINATE OIL AND WATER

from Compressed Air Lines

with

SWENDEMAN SEPARATORS

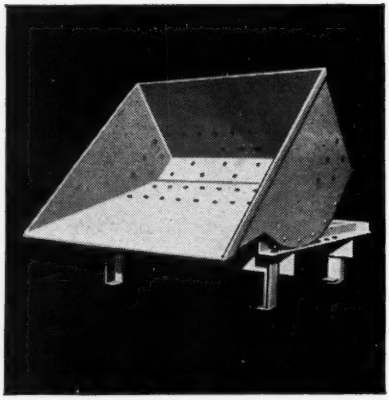
The SWENDEMAN Separator is designed for the sole purpose of removing water and oil condensation from compressed air lines. It is simple, compact and dependable. It is entirely automatic in operation, easily installed, and requires no complicated piping.

Avoid loss from spotted paint jobs and clogged, inefficient machinery caused by oil and water in air lines. Install SWENDEMAN Separators and be sure of clean air at all times.

Our engineers will be glad to help you with your problems. Write for details.

THE LEAVITT MACHINE CO.

ORANGE **MASSACHUSETTS**



Roura Dump Hopper

and is also furnished for end dumping. Special alloy steel is used in its fabrication and sides and bottom are perforated, both precautions being taken to enable the hopper to resist warping. The hopper is furnished on legs or casters with any specified underclearance, and has one yard capacity. It is equipped with a simple latch which holds the load securely in position and when unlatched, enables the hopper to be emptied promptly and cleanly.

Industrial Rubber Mounting Manual

As a result of popular demand the United States Rubber Company, New York, has issued a practical manual which will serve as a ready reference for engineers, plant operators and executives on the application of rubber mountings to modern industrial use. Rubber mountings, properly designed and fabricated and installed in accordance with sound engineering practice, have proven of outstanding usefulness for absorbing vibration, preventing "telegraphing" of noise and cushioning impact.

The issuance of this manual is to assist engineers in properly adapting the various "U.S." designs to their specific needs. It gives complete engineering data, indicating the various characteristics of rubber, graphs showing its deflection curves, and its safety load limits.

Descriptive illustrations show specific uses to which these mountings have been put. These include the recently installed rubber mounted floor in the new Physics Laboratory at the Massachusetts Institute of Technology, which functions so successfully that not even the reversing of the 8000 pound planer produces shock on the rest of the building. Copy free upon request.

Mico High Intensity Illuminators

Three high intensity illuminators have been brought out by Mico Instrument Co., 10 Arrow St., Cambridge,

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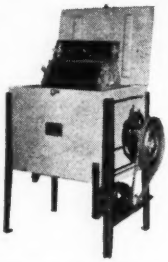

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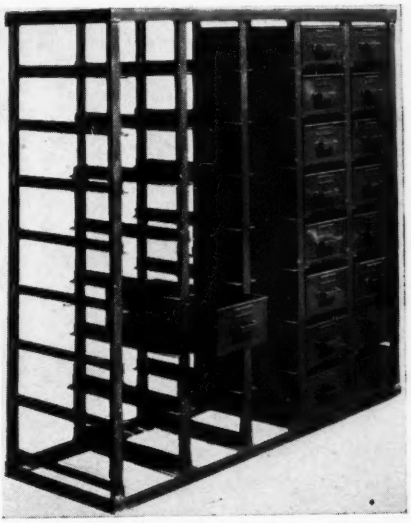
Mass. The basic unit for each of these light sources is a well proportioned aluminum casting that provides a strong housing for the lamp and a focusing slide for the condenser. They are designed for use with microscope, optical benches, oscillographs, galvanometers and other projection devices.

All three illuminators can be mounted on rods, holes being provided for mounting on clamp stands. Focusing of the condenser slide is positive, a helical groove in the tubing providing the adjustment. The "Micolite" unit uses a 50-watt tungsten lamp. Housing for this unit is well ventilated and will operate in any position. A mercury quartz lamp is used in the "Mico-Hi-Lite" unit giving a high intensity beam. "Mico-Vi-Lite" unit is a powerful source of ultra-violet light, using a mercury quartz lamp with an ultra-violet filter in place of the glass condensing lens.

Sterling Box and Bin Rack

The rack illustrated has been developed by the Sterling Factory Equipment Co., Inc., 189 Charles St., Providence, R. I. It can be furnished to fit any size of box and to go into any size space.



Sterling Box and Bin Rack

The type of construction used makes the

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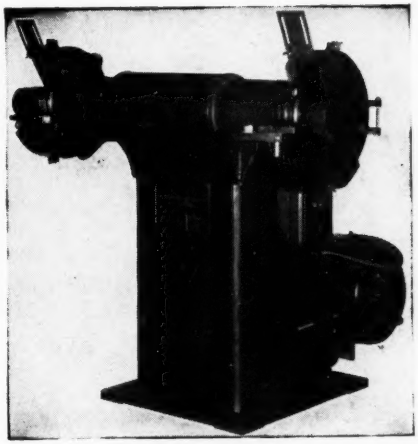

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rack flexible enough so that it can be adapted to any box storage requirement. The rack is of all welded construction, which gives it rigidity. It is ready to use when received.

The Sterling rack utilizes full storage space. By avoiding the need for cross pieces under boxes, the space of two 5 in. high boxes is saved in a 5 ft. high rack. Uprights are stocked in from under bench height up to 5 ft. Runners are stocked to fit boxes 12, 18, 24 and 30 in. long, but can be furnished for other sizes. Connectors are made up to 5 ft. long. For heights over 5 ft., racks are made to fit one on top of another. The box shown in the rack is 10½ in. wide, 6 in. deep and 21 in. long. This or other size boxes or bins of steel are made to fit Sterling racks.

Patterson Agitators & Mixers. The Patterson Foundry & Machine Co., East Liverpool, Ohio, is now issuing a 10 page catalog in which Patterson Agitators and Mixers are illustrated and described. This catalog deals primarily with one application of the liquid mixer line—the Patterson Typhoon Portable Mixer—illustrating also various other high speed Propeller Type Agitators. In the design of the Patterson Typhoon Portable Mixer, Patterson engineers have embodied the high standard of quality and workmanship that is found in all Patterson equipment. The Patterson Typhoon Mixer is said to meet a definite need for an economical and efficient method of agitation. It is light in weight and can be easily moved from one container to another, and one mixer may therefore be used on several containers. The downward thrust propellers insure a complete bottom-to-top turnover of the product being mixed, completely eliminating the possibility of heavy particles remaining in the tank.

The catalog emphasizes the fact that Patterson engineers are equipped to analyze a mixing problem thoroughly and scientifically so that the best possible mixer can be recommended for a particular use. Copy of the catalog free upon request.

Chemical Publishing Company Catalog No. 5. This 136 page spiral bound catalog, listing and describing chemical, bacteriological, engineering, electrical and general scientific and other technical books of American and British publishers, is now being offered to technical workers by the Chemical Publishing Co. of N. Y., Inc., 148 Lafayette St., New York, N, Y. This catalog is said to eliminate the necessity of filing and looking through catalogs of many technical publishers, thus saving a great deal of time and effort. Catalog No. 5 will be mailed to any technical worker who will send 10 cents in stamps or coin to cover mailing to the Chemical Publishing Co., of N. Y., Inc.

"Impervious Insulating Varnishes and Compounds." Impervious Varnish Company, 2228 Koppers Bldg., Pittsburgh, Pa., is now issuing this 10 page booklet

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decribing the regular line of Impervious Insulating Varnishes and Compounds. All Impervious Insulating Varnishes have high dielectric strength and resistivity. Some of the black varnishes, as stated in the chart on pages 4 and 5 of this booklet, are not oil proof. The life, or heat endurance, is directly proportional to the baking time. Black varnishes have slightly better water resistance than clear varnishes, the greasy type varnishes being best.

The selection of the most suitable varnish for the purpose and preparing shop specifications for its use is an engineering problem which requires a knowledge of varnish chemistry as well as electrical design and production methods. The Impervious Varnish Company offers its co-operation in helping to solve such problems.

A copy of the booklet which briefly describes Impervious Insulating Varnishes and Compounds free upon request.

Reliance Disc-Brake Motor Bulletin 305. This bulletin, comprising a loose leaf page for insertion into a catalog, presents the features of Reliance Disc-Brake Motors. The motor is illustrated by means of photographs and a cross-section drawing showing the brake with double friction lining. The points of design featured in the bulletin are the housing, friction elements, wear indicator and manual release, adjustments, leads, ratings, installation and maintenance. Copy free upon request.

Severance Tool Mfg. Co. Catalogue No. 11 and Booklet No. 11A. Two new pieces of literature have been issued by Severance Tool Mfg. Co., 1516 E. Genesee Ave., Saginaw, Michigan. Catalogue No. 11 lists 170 Standard Midget Milling Tools and Booklet No. 11A illustrates many special tools and uses. Copies may be obtained by signing your name on your company letterhead and writing to the company.

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